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The Outlook

Our Defence Programme

PERUSAL of the Government's White Paper, *Statement on Defence*, 1949, gives little cause for complacency, especially if considered in conjunction with recent decisions taken in America. The complete absence of any reference to bombers, new or old, and the American cancellation of huge orders for modern aircraft types in favour of existing ones, combine to point the inescapable conclusion that there is now in the highest quarters a much greater sense of urgency.

While one should not assume that war is regarded as inevitable in the fairly near future, one is entitled to form the opinion that the Western Governments do not rule out this possibility, that short-term policies which will give more rapid results are taking the place of the more forward-looking, and that we and America are agreed on the need for quick action.

If our interpretation of the situation is correct, the omission from the *Statement on Defence* of any mention of bombers lends force to the rumours which have been current for some time, that the R.A.F. may soon be flying some American bombers, and that examples of the huge Convair B-36 may visit this country.

While such a step would be resented on certain grounds, it should be remembered that we should have only ourselves to blame for it. It was announced with a fanfare of trumpets some years ago that the R.A.F. was to be re-equipped with jet-propelled bombers, and that no more piston-engined ones would be ordered. At the time we uttered a warning that the jet power plants were still in an early stage of development, and that there might be hold-ups which would leave an unfortunate gap before the new bombers could go into service. So far not a single jet-propelled bomber has emerged, even in prototype form, due to the fact that the Air Ministry had second thoughts on the performance needed. If their requirements had not been stepped-up, we might have had a few jet bombers now.

Thus, whatever offence might be given to one's *amour propre*, it would be sensible to give Bomber Command the best aircraft available, irrespective of nationality, now that we find ourselves in this lamentable situation.

A Phraseological Hint?

THERE may be some significance in the phrasing of the Defence-Statement paragraph which deals with equipment: "The Royal Air Force programme continues, at an increasing rate, the re-equipment of the fighter squadrons with the latest types of jet aircraft and provides for the gradual replacement of transport and training aircraft by modern British types." The insertion of the word "British," which at first sight appears somewhat superfluous (one notes that it is not used in conjunction with "Commonwealth"), may or may not be intended to convey that certain other types will not be British.

In this sentence the word "gradual" presumably refers to the Hastings in the transport class, and to the Prentice, Balliol and/or Athena among the trainers, which would infer that there is less urgency where these types are concerned than in the case of the jet fighters.

Of the war potential the Statement has this to say: "In the aircraft industry the specialized nucleus of firms which design airframes and aero-engines and would lead and train newcomers if we had to mobilize industry for war has been maintained." Not referring specifically to the aircraft industry, but very significant, is the further statement: "Plans for the transition from peace to war production are being prepared, and a start has been made on the compilation of a register of industrial capacity earmarked for specific purposes."

Only a very dull intellect could fail to be impressed by the gravity of the position disclosed as much by what is left out of the Statement as by what it contains

The Man-power Problem

COMMENDABLE as are the plans for expansion of industry in case of emergency, based on the existing nucleus of designing firms, they will be of no avail unless sufficient numbers can be recruited for the manning of the Royal Air Force.

The Government now realizes that it is essential that a high proportion should be regulars, and all must sympathize with the intention expressed in the Statement "to do everything in their power to stimulate recruitment for the regular Forces and the re-entry of time-expired men." Certainly, so far as the Air Ministry is concerned, there is much room for improvement in the approach to recruiting, but appeals will not suffice, no matter how well presented. There must be a drastic overhaul of certain service conditions. Recent articles and correspondence published in *Flight* have indicated a diversity of views on what is wrong and what is needed to put matters right. There is no unanimity, nor could it be expected. But by careful sifting of the many opinions expressed, the Air Ministry should be able to trace some of the worst obstacles to reviving the old spirit of the R.A.F. It still survives in many squadrons and on several stations. What is needed is that it should pervade the entire Service.

Our own view is that, first and foremost, officers and N.C.O.s must be better trained in man management. Sir Philip Joubert, in his first article (December 9th, 1948) stressed this point. On the Correspondence pages of this issue a letter from a former Army officer quotes famous leaders on the subject of discipline. Sir Philip, we may recall, expressed it that discipline "must be administered by officers and non-commissioned officers who have been trained properly in the art of man management, and who are prepared to give not only their working hours but their hours of relaxation to the service of their men." Our correspondent in this issue quotes General Wavell as saying: "Give your men the best you can give them when circumstances allow, and then drive them hard when you have to."

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If it be agreed that discipline, *of the right sort,* is the first need, the most urgent task is to attract the right type of officer material, and then to give the best possible training in man management. But the new rates of pay, as many of our correspondents have pointed out, are not such as to make it possible, in many instances, for officers to make both ends meet, and not a few have had to resign from the R.A.F. for that very reason, although they loved the Service and would have preferred to remain in it.

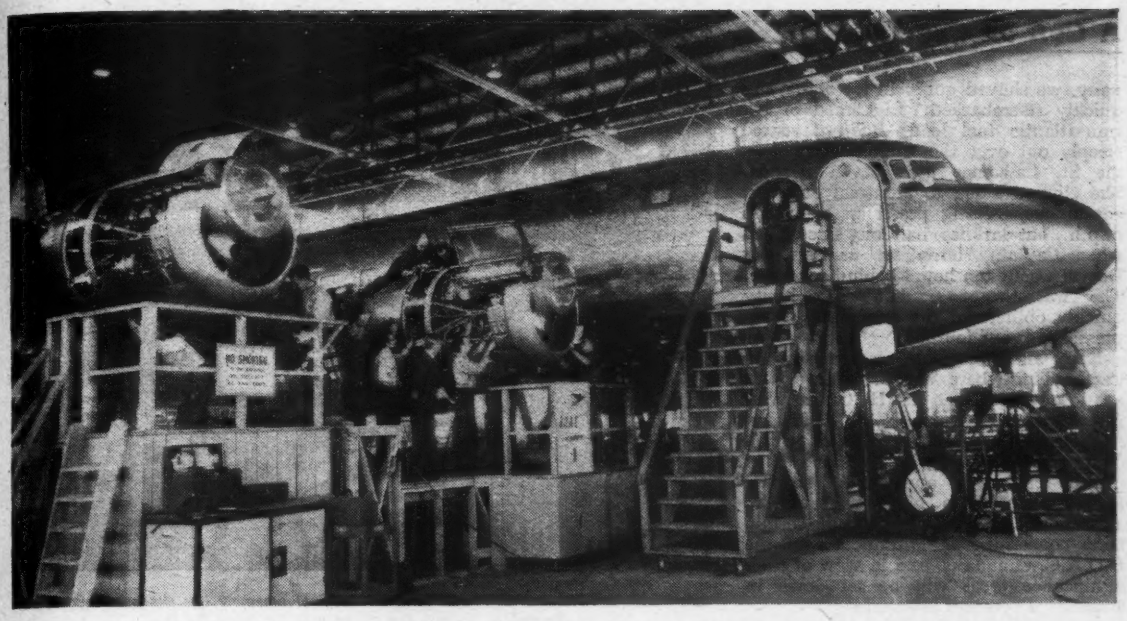
Next comes the question of "other ranks." The Statement outlines various steps which are being taken to make conditions of service such as to compete on reasonably equal terms with employment in civil life, and to ensure that there are openings for ex-regulars in civilian occupations when they leave the Service.

That is all very commendable, but actual conditions of certain work must be improved. For instance, one feels that in this age of mechanization too little has been done to take some of the drudgery out of station work as distinct from aircraft servicing and maintenance.

The Statement refers to waste of man-power and to concentrated effort to secure progressive improvement. Our Correspondence has indicated fruitful fields.

***PROOF POSITIVE:** When a letter of intent was signed on July 24th last year covering the construction of twenty-two Canadair Fours for B.O.A.C. doubts were widely expressed regarding the manufacturer's ability to deliver on time. The first machine was to be handed over by May 30th this year. Here, on Canadair's final assembly line, are the first five machines of the order, Number 1 of which should be flying before the end of the month. All twenty-two should be delivered months ahead of schedule and, after completing four similar machines for Canadian Pacific Air Lines, Canadair are confident that they can deliver as many as twenty additional aircraft before the end of the year.*

B. 1



"B.O.A.C. Number 1", with its four Rolls-Royce Merlin 626s installed, at the head of Canadair's final assembly line.

A Call on Canadair

PART I: B.O.A.C. Fleet on the Stocks at Montreal

By H. F. KING, M.B.E.

TO inspect production of Canadair Fours under construction for B.O.A.C. I left London Airport in Constellation *Bedford* on the night of Sunday, February 13th. Though merely incidental, the passage to Montreal provided some interesting experiences of winter flying over the North Atlantic, warranting brief mention in this account.

Though every comfort and attention was accorded by B.O.A.C., difficulties dogged the flight from the start; whereas the take-off time was scheduled for 7 o'clock, *Bedford* was grounded until 10-15 by c.s.u. trouble and we were not in Prestwick until after midnight. An oil leak now delayed us until nearly 3.30 on Monday morning, at which time the steward broke the news to our tired and fretful company that Iceland—not, as we had expected, Newfoundland—would be our next stop. Faced with 100-knot winds, *Bedford* ascended in moonlight to 20,000ft and at 7.40 G.M.T. was on a G.C.A. approach through a snowstorm to Keflavik (formerly Meeks Field). From the aircraft to shelter our way was fraught with the perils and discomforts of ice, snow, darkness and ferocious wind; but bacon and eggs, and coffee with tinned milk from its original container, worked such internal wonders that another three-hour wait was endured with a minimum of profanity. The cheery company of Mr. "Tim" Sims, of Canadair's sales staff, was a blessing indeed.

At last the "Connie" was poised at the runway head; but once again she was to be frustrated. As Captain Heron was in the very act of opening up the four Cyclone 18s, a snow blizzard of such density and force swept down the airfield that take-off was utterly impossible, and *Bedford* stood muttering until such time as fury abated and some view of the runway was temporarily offered.

For the next 8½ hours we were cruising in sunshine, mostly above thick cloud and against a wind which at one point reduced our speed to 167 m.p.h.; but by marvellous luck we were granted a view of Greenland—a forlorn, frozen and ice-encompassed land, compared with which Goose Bay, Labrador, where we touched down at 19.01 G.M.T., appeared a rest home. Here the thermometer stood at minus 8 deg F.—a mere 40 deg of frost, and insufficient to deter us from remaining long enough in the bright, freezing air to watch an R.C.A.F. Dakota taking off on skis.

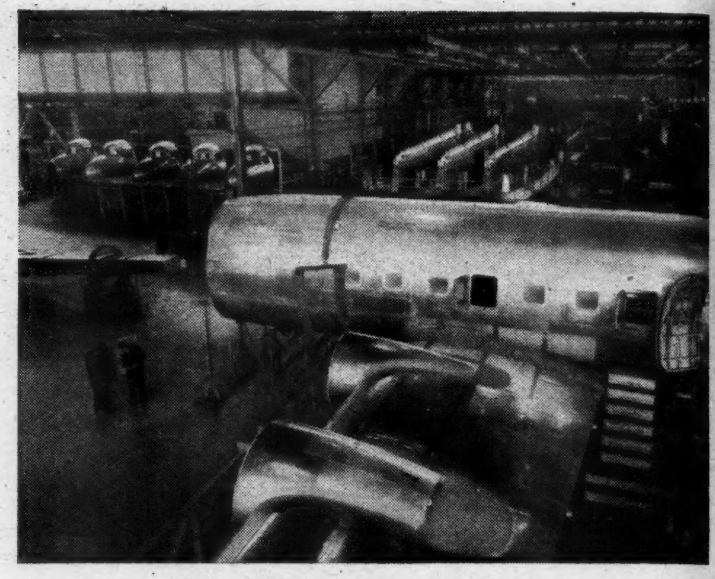
Deploring our inability to visit the nearby post of the Hudson's Bay Com-

Canadair and B.O.A.C. officials in conclave at Cartierville, Montreal. Mr. Emmert, vice-president of Canadair, is at the head of the table and Mr. Strawson, B.O.A.C's senior plant representative, is in the centre of the nearer group

A Call on Canadair . . . . .

pany, we shaved gorily in icy water and quickly re-embarked. Lightened of her transatlantic fuel load, *Bedford* soared steeply out over the wilderness to meet the St. Lawrence near Seven Islands. She clipped along to Montreal on max. continuous cruising power at some 270 m.p.h., but darkness had long since fallen when Captain Heron set us down at Dorval about ten hours behind schedule. The warmth of Canadair hospitality quickly obliterated the less pleasant impressions of our journey.

Early next morning we were out at Cartierville, where the Canadair plants are located, to meet Mr. H. Oliver West (president of the company), T. J. Emmert (vice-president), R. A. Neale (vice-president, manufacturing), K. G. Smith (chief project engineer), and J. G. Barker (comptroller). This meeting served to acquaint us with, or remind us of, certain facts concerning the production of the B.O.A.C. Canadairs, and in view of their significance these will be set down in advance of personal impressions.



As "B.O.A.C. Number 5" takes form on the final assembly line, its nose section, on the end of its own line, is seen to be ready for it

It was startling, I must confess, to be reminded that the first letter of intent covering the construction of Canadair Fours was signed as recently as July 24th last year. Thereupon, Canadair opened negotiations for definitive contracts, and such specification changes as might be required. The "specs." were completed on September 30th and the contracts signed, providing for delivery of the first aircraft in the eighth month from September 30th—that is, by May 30th this year. The first five of twenty-six Canadairs (twenty-two for B.O.A.C.; four for Canadian Pacific Airlines) are now on the final assembly line, and major sub-assemblies are well ahead of time estimates. B.O.A.C. Number I—started only 97 normal working days before our visit—has its Merlins installed, and is expected to fly before the end of February, and there is good reason to believe that this machine will be delivered to England many weeks ahead of contract. The order should be completed several months in advance of requirements and it is hoped at Canadair that this performance will attract additional orders. These, obviously, must soon be placed if the production flow is not to be interrupted, and the company has sales representatives in many parts of the world. Talks have already taken place in Australia, New Zealand, South Africa and Italy. Such is the production position that as many as twenty additional "Fours" are confidently offered by Canadair for delivery this year.

In the Shops

So that we might see for ourselves how the line stands, Mr. West and Mr. Emmert conducted us to the factory. Here, sure enough, was No. 1, with its four Merlin 626s in place and cowled, and de-icer and undercarriage tests under way. Handsome is, we minded, as handsome does, and the performance of the Canadair Four on the Empire route is yet to be proved; but there is no question that this is one of the best-looking of large transport aircraft. When we ourselves saw it, No. 1 was at Station 2, the first position on the line being occupied by an unpressurized North Star of the R.C.A.F.—one of 20 supplied—in for overhaul. Close on the tail of No. 1, the second machine was seen to be far advanced, though without engines; No. 3 was likewise engineless and awaited outer mainplanes; No. 4 was wanting its nose; and Nos. 5, 6 and 7 were sufficiently advanced to be recognizable.

Having ascended to the interior of No. 1, we saw furnishing and equipping to be well under way. It was explained, however, that the seats installed were not those for B.O.A.C., the Corporation having selected a special Vickers-Armstrongs type of seat, the first set of which was awaited. There are 24 seats in the forward cabin and 16 aft. No resting quarters are provided for the crew, as on the North Stars of Trans-Canada Air Lines, and there are certain other respects in which the B.O.A.C. layout differs from those for T.C.A. and C.P.A. Men's and women's dressing rooms are forward, and in place of a ladies' powder room usually found at the extreme rear end of the second compartment there is a cosy little lounge with seats arranged in an arc, following the curvature of the dished pressure bulkhead, and furnished with a detachable table. Of the seats, two only are stressed for take-off and landing, and these will be occupied at the beginning and end of a flight by the steward and stewardess. The rear lounge (which one predicts will be especially popular with those who seek solace on long journeys in a drink and a pack of cards) is upholstered in dark blue, as will be the chairs in the main cabins. The secondary colour is a blending creamy blue and the general scheme follows that adopted for B.O.A.C.'s Stratocruisers. Extensive use is made of Flexwood metal-wood-veneer bonded sheet for bulkheads and lounge panels.

Some minor rearrangement of the pilots' cockpit was a B.O.A.C. requirement; engine instruments have been regrouped; torquemeter and power meters are fitted, and the pedestal adapted for control of the braking airscrews, with which the Merlin 626-1 engines of the B.O.A.C. machines are fitted. When the throttles are closed beyond the neutral position, the pitch reverses for braking, and means are provided to prevent selection of reverse pitch until weight is on either the nosewheel or one of the main twin-wheel assemblies. A folding seat is provided in the cockpit for a supernumerary crew member or observer.

The first few of the B.O.A.C. aircraft will be delivered with the present exhaust system, i.e., Canadair Lincoln-type manifolds on the inboard bank of each engine and Rolls-Royce stubs on the outer banks. Somewhere along the production line the new Rolls-Royce cross-over system will be introduced. Total enclosure within the cowling may confer some slight aerodynamic advantage. For take-off the cross-over pipes, which carry the exhaust of the inboard cylinder banks across the engines to exhaust on the outboard side, will be by-passed. Cruising, with the cross-over system in operation, the B.O.A.C. Canadairs should be appreciably quieter than present machines of the type, and the extra weight will be more than compensated by new aluminium radiators.

The Merlin 626 as supplied for B.O.A.C. has 0.42:1

reduction gearing; 14 lb maximum continuous boost; 20.5 lb take-off boost and a full-intercooling scheme, whereby for take-off and climb not only the ordinary intercooler matrix is used, but a second matrix, which has hitherto served solely as a charge-heater. An effective increase in power rating is afforded by the lower charge temperature under the critical conditions of take-off and landing. The Merlins now operate for 800 hours between overhauls at a cost per h.p. claimed to be as low as for any air-cooled commercial engine of comparable output. Power plants are quickly interchangeable between all four nacelle positions.

(To be concluded next week)

REDUCING OPERATING COSTS

B.E.A. Introduce New Maintenance Check System

PURSUING their policy of reducing service maintenance costs by increasing efficiency, British European Airways Corporation have instituted a new maintenance check system at Northolt. The underlying principle is to dispense, wherever possible, with checks at certain periods of elapsed time and to relate maintenance to actual flying hours completed.

Taking the Dakota as an example of a typical transport aircraft, the check periods hitherto laid down, based on a number of years' experience of operating this type in England, were as follows:—

Check 1	every 24 hours elapsed time.
Check 2	every 25 flying hours.
Check 3	every 100 flying hours.
Check 4	every 400 flying hours.

Since an aircraft might have flown only a few minutes between repetitions of Check 1, it has been thought preferable to allow Check 1 to take place before every flight instead of after every 24 hours elapsed time. Furthermore, in the case of the Dakota, a total of 45 modifications have been made by B.E.A. during the last 14 months to improve maintenance and safety characteristics. The result has been to make it possible to extend periods between checks, and the new system now in operation calls for the following schedule:—

Check 1	before every flight.
Check 2	every 30 flying hours.
Check 3	every 150 flying hours.
Check 4	every 600 flying hours.

These steps to reduce maintenance costs have, of course, been taken with the full knowledge and approval of the A.R.B., with whom B.E.A. are in constant consultation. Other aircraft besides the Dakota will undoubtedly come under the new system. As applied to the Viking, for example, it will involve the following schedule:—

Check 1	before every flight.
Check 2	every 30 flying hours.
Check 3	every 120 flying hours.
Check 4	every 480 flying hours.

Next, it has been decided that the hitherto annually renewed Certificate of Airworthiness should be put on a more progressive basis, by spreading the C. of A. overhaul over an extended period instead of leaving a large volume of work to be done once a year. Thus Check 4, which under the new system is to be performed every 600 hours, will for all practical purposes represent one-quarter of a C. of A. overhaul so that, in effect, a C. of A. overhaul will have been completed after four Check 4s, i.e., 2,400 flying hours. It is felt, also, that this spread-over system will achieve an improved safety standard.

It is B.E.A.'s intention to replace accessories and components at times when they are rendered accessible by the progress of other maintenance work rather than at defined periods. Experience has shown that engine-overhaul periods can be safely extended—as in the case of Hercules 634, the life of which has been prolonged by as much as 200 hours. The co-operation of pilots in adhering to performance limitations specified for engines can make a considerable difference to the wear and consequent life, and for this reason "nursing" of engines in flight will be encouraged.

B.E.A. have also arranged with manufacturers to purchase replacement engines, in exchange for those requiring overhaul, on a fixed hourly basis. Thus, by returning power plants for makers' overhaul after a certain period of service, B.E.A. are, in effect, purchasing flying hours from the engine manufacturers and at the same time eliminating the necessity of holding large numbers of engines in stock. Similar arrangements have been made for instruments.

One of the aims of B.E.A.'s chief engineer, Mr. B. S. Shenstone, is to introduce in due course a form of statistical maintenance-control. By this method an analysis of defects-experience over long periods can be used to determine which defects have occurred most frequently in the past and which can therefore be anticipated in the future and circumvented.

The incentive bonus scheme recently introduced into the C. of A. hangar at Northolt by the Corporation with a view to increasing efficiency has settled down after the teething troubles referred to in *Flight* of November 18th, 1948, and is generally considered to be popular amongst those working on the new basis. There are now about 130 fewer engineers working in the C. of A. hangar and, in the main, those who became redundant as a result of the scheme have been absorbed by other branches of the industry. The popularity of the new arrangement can be gauged by the fact that two other shops have been reported as having asked to be included, and it is expected that in the near future all B.E.A. engineers at Northolt will work on the premium bonus basis. Plans are in hand for extending the scheme to Renfrew. The introduction of the new rationalized aircraft maintenance scheme outlined above may also, it is considered, result in a further increase of efficiency and a reduction in labour costs.

It is apparent that by the introduction of these measures B.E.A. are energetically implementing the policy of economy through efficiency laid down by the Minister of Civil Aviation and, since the policy has been dictated by the Government, no serious opposition from the Trade Unions is expected.

BRISTOL 171 ACCESSORY DRIVES

IN the recent description of the Alvis Leonides helicopter power plant the information was passed on that in the case of the Bristol installation certain accessories are driven off the tail-rotor shaft. We are now informed that on the latest Type 171 Mark 3 they are, in fact, driven off the main rotor gear box.

GIBRALTAR AIRWAYS

DURING the first 17 months of its operation, Gibraltar Airways, an associate of British European Airways, has carried over 17,000 passengers and logged more than 2,000 flying hours. Operating with four six-seater Rapides, regular services are flown between Gibraltar and Tangier and frequent charter flights are made to Lisbon, Malaga, Seville, Tetuan, Melilla, Casablanca and Algiers. In addition to normal services which have operated without a single break, with the exception of Christmas Day, 1948, since the airline was formed, traffic staff at Gibraltar have handled 170 aircraft belonging to other companies. During the 17 months Gibraltar Airways has also carried about 131 tons of baggage and approximately 10 tons of mail and freight.

PERSONAL PUSHER: This metal mock-up of an unorthodox two-passenger light aircraft shows the efforts of Northrop Aeronautical Institute students to provide an ideal answer to the requirements of many private owners. The prototype powered by a 90 h.p. Franklin flat-four, is expected to fly in 18 months. Cruising speed is estimated at 125 m.p.h. Northrop retractable spoiler-type ailerons, as employed by the Black Widow, are specified, permitting full-span flaps.

HERE AND THERE

Helicopter Night Mail

AN experimental night-mail service between Peterborough and Norwich is being operated this month by the B.E.A. helicopter unit based at Westwood Airfield, near Peterborough. The schedule planned is for the Westland-Sikorsky S.51 to leave Peterborough at 2200 hrs nightly, arriving at Norwich at 2256; the return trip is made at 0150 hrs, arriving at 0256. The series of flights was due to begin last Monday.

Certified

AIRWORK Charter Division have produced an amusing crossing-the-line certificate, with appropriate embellishments by David Langdon. The certificate begins "I, Aeolus, God of Wind, sole air concessionnaire for Neptune Enterprises (Barbering), Ltd., hereby certify that . . . ., having enjoyed the equatorial wash and brush-up on board Airwork aircraft . . . . at Long. . . . Lat. 0° (the equator, you know) . . ."

A.B.A.C. Ball "Off"

THE Association of British Aero Clubs and Centres has regretfully decided to cancel the third annual United Flying Clubs' Ball, which was to have taken place at the Dorchester Hotel, London, on March 11th. The organizers say that advance bookings—or the lack of them—have reflected the financial stringency which is being generally felt. Instead, a more simple function—a "summer conversazione"—is to be held at Fair Oaks on Saturday, September 3rd.

Maintenance Snags

INACCESSIBLE nuts and bolts, fuel warning lights which cannot be removed without draining the fuel system, fairings and cowlings that have not been jig-drilled to make them interchangeable between aircraft of the same type; these are some of the maintenance snags in Service aircraft which should receive the attention of constructors, according to S/L. E. A. Harrop, O.B.E., A.F.R.Ae.S., in his R.Ae.S. lecture last week. We hope to give some detailed abstracts of his remarks in our next issue.

DC-3 Modernization

DOUGLAS has announced a programme of modifications, calculated to improve performance, to DC-3s now in service. At an estimated cost of up to £50,000, the plan includes the installation of more powerful engines, each giving nearly 1,500 h.p., and the fitting of cropped," square-cut wings, with a 4-deg sweep-back. Modified tail unit, cockpit, and nacelles are also incorporated. Cruising at 234 m.p.h. is expected.

THE EVER OPEN MAW: Loading a 3¼-ton air compressor into a Bristol Freighter at Blackbushe airport for conveyance to Saudi Arabia, where it will be employed on the construction of a seven-mile pier.

Swedish Jet Progress

IT is learned from Sweden that a second, modified, prototype of the Saab J-29 Ghost-powered jet fighter, which first flew last September, is nearing completion and will fly shortly. A third machine is expected to be ready during the spring.

Salesmanship Flight

MR. IAN BROWN, the pilot of the Percival Proctor which is on a survey flight from England to Australia for Sponson Developments, Ltd., was temporarily detained last week by the quarantine officials upon arrival in Karachi because none of the occupants of the machine possessed yellow-fever injection certificates. Mr. Brown reports orders received from Greece and India for the Tribian Mark II 5/6-seater as a direct outcome of the trip.

"Now that's what a pilot ejector looks like."

One Million Tons

THE millionth ton of supplies to reach Berlin since the Air Lift began last June was flown into Gatow in a Transport Command York on Friday, February 18th. S/L. E. Best, a New Zealander, piloted the aircraft, and Air Marshal T. M. Williams, Air Officer Commanding, B.A.F.O., acted as second pilot.

A message has been sent to the British Military Governor in Germany by Mr. Bevin, congratulating the Service and civilian personnel who are flying and maintaining the Lift.

Reading R.Ae.S. Resumes

AFTER a lapse of a year, the Reading and District Branch of the Royal Aeronautical Society has been re-established, and activities will begin with a lecture, on March 9th, by G/C. A. F. Bandit. The branch president is Sir Frederick Handley Page, Mr. E. Gray, A.F.R.Ae.S., is chairman, and Mr. J. G. Roxburgh, Grad. R.Ae.S. (c/o Handley Page (Reading), Ltd., Woodley, Berks), is the hon. secretary.

Radio Aids for Burma

IN an effort to equip twelve Burmese airstrips with radio navigational aids before the monsoon breaks next month, International Aeradio, Ltd., have designed and built the requisite equipment in under three months. Six major subcontracts were given to leading radio firms and over a hundred smaller orders placed. At an informal ceremony at Bovingdon last week A. Cdre. Colin S. Cadell handed over the equipment to the First Secretary of the Burmese Embassy.

Successful Tour

AFTER completing the 20,000 mile demonstration tour of South Africa, "African Enterprise," the Bristol Type 170 Freighter, landed at Filton Airport, Bristol, on February 10th. During the six-weeks tour the aircraft flew over 24 different countries and logged 120 flying

HERE AND THERE

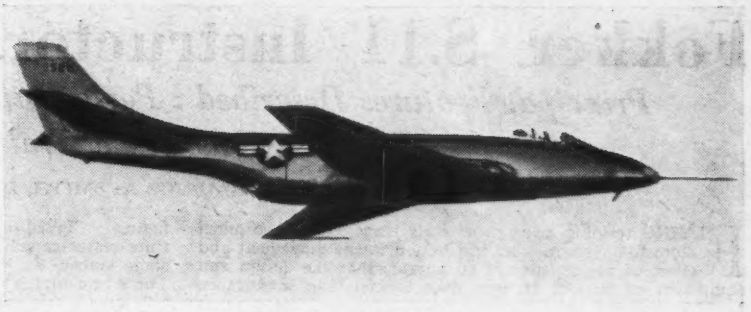
hours. The route lay through Egypt, Abyssinia, Kenya, Mozambique, the Union of South Africa, Rhodesia, Angola, French Equatorial Africa, Nigeria and the North West coast, and on the return journey two days were spent in Lisbon. Captain K. J. G. Bartlett, the Bristol Aeroplane Company's Sales Director, who accompanied the aircraft on the tour, said that the aircraft had been completely trouble-free and that it had never been more than five minutes out of schedule.

Spicer Memorial Film Show

THE Society of Licensed Aircraft Engineers announce that a film show will be given in aid of the Dorothy Spicer Memorial Fund on Friday, March 25th, at 6.30 p.m. in the Livingston Hall, Broadway, Westminster, S.W.1, under the patronage of Sir Frederick Handley Page, C.B.E., F.R.Ae.S. Mr. William Courtenay will show four colour films on the U.S. National Air Races, Cleveland, Ohio, 1948; the atom bomb trials at Bikini, July 1st, 1946; and the B.O.A.C. routes to New York and Johannesburg. Admission will be by ticket only, obtainable price 5s each from the Society at Finsbury Circus House, Blomfield Street, E.C.2, or from D. G. Thorpe, Esq., Gable End, Rusthall, Tunbridge Wells, Kent.

U.S. Navy Blimp

FURTHER details of the non-rigid airship on order for the U.S. Navy, referred to in *Flight*, January 27th, have been released by the Goodyear Aircraft Corporation, of Akron, Ohio. This lighter-than-air craft will have a helium capacity of 100,000 cubic feet greater than previous types of U.S. Navy airships, and its overall height will be 92 feet. Constructed on a two-deck plan, the total length of the car will be 87 feet. All controls will be power assisted and the envelope itself is to be made of three-ply fortisan-rayon fabric coated with neoprene synthetic rubber. The "blimp" will be propelled by two 18-feet reversible controllable pitch airscrews driven by a transmission system which will allow either engine to drive one or both airscrews as desired. These engines will be enclosed within the car, giving greater accessibility for repair and maintenance whilst in flight.



SLEEK SHIP: The jet orifice "Step", for the McDonnell XF-83's two Westinghouse J-34 axial-flow turbojets, is clearly shown in this new photograph, taken as the aircraft made its first flight at Muroc, California, recently. Classed as a penetration fighter, the XF-83 is reported capable of extremely high speeds

D.H. Servicing School

SINCE its formation in 1941 the de Havilland Servicing School at Hatfield has completed the training of 7,770 flying and ground personnel. This figure includes 3,857 pupils trained since the end of the war against Japan. Analysis shows that trainees have come from all parts of the world to take the courses on operation and maintenance of de Havilland aircraft and engines provided by the School. In addition to trainees from the Empire and overseas, Naval, Air Force and civilian personnel have also undergone training.

S.L.A.E. Maintenance Schedule

PUBLISHED by the Society of Licensed Aircraft Engineers, a 28-page brochure contains a specimen maintenance schedule suitable for an unspecified type of aircraft with an all-up weight of approximately 6,000lb. The foreword and introductory pages explain the operation of such a schedule in relation to the issue of Certificates of Safety under the present system and under the new system, which is expected to become law in the coming spring and which relates such certificates to flying time. The relationship of maintenance done, in strict accordance to an approved schedule, to the issue of C. of A. is also explained. Maintenance in accordance with such schedules has been gradually introduced during the last few years, and publication of this specimen is particularly opportune at the present time, when scheduled maintenance will be essential under the revised system of issuing Certificates of Safety.

NAVAL VISITORS AT LANGLEY: Photographed during a recent visit to the Hawker factory at Langley this group includes (l. to r.) Mr. T. O. M. Sopwith, Mr. T. Sopwith Jn., Mr. W. Humble (almost obscured), Rear-Admiral The Mackintosh of Mackintosh, Vice-Admiral Creasey, Mr. T. D. M. Robertson, Mr. J. V. Stanbury and Mr. R. H. Chaplin

Caribbean Survey

TO commence a three-months aerial survey of the West Indies and South America, a Lockheed 14 belonging to the Photographic Survey Corporation of Toronto, Canadian associate of the Hunting Aviation Group, recently left Oshawa Airport. The Corporation is undertaking aerial surveys for Government agencies and for private companies in the Caribbean area. The members of the aircraft crew are all ex-members of the R.C.A.F. and on this trip pilot, engineer, navigator and camera operator will be carried.

News in Brief

To take up a position as Development Manager with Conrad Parlanti Castings, Herne Bay, Mr. V. C. McDonnell, M.I.Mech.E., has resigned from the de Havilland Engine Co., Ltd., where he was production manager of the Development and Research Division.

* * *

After 19 years' service with the Company, Mr. F. Stanley Mockford, Commercial Manager of Marconi Wireless Telegraph Co., Ltd., has been elected Chairman of the Radio Communications and Electronic Engineering Association. Mr. V. M. Roberts, of the British Thomson-Houston Co., Ltd., is the new Vice-Chairman.

* * *

On his appointment to the Sub-Committee on Helicopters of the International Advisory Committee for Aeronautics, Charles H Kaman, 29-year-old president of Kaman Aircraft, was selected by the Hartford, Connecticut, Chamber of Commerce as the Outstanding Young Man of the Year.

* * *

The B.P. Aviation Fuel Service of the Anglo-Iranian Oil Co., Ltd., have issued a printed schedule of the airfields and addresses throughout the world at which fuelling facilities can be arranged. All U.K. enquiries concerning overseas availability should be made to the London office, Britannic House, Finsbury Circus, E.C.2.

* * *

The fourth of a series of books for businessmen produced jointly by B.O.A.C. and the British Bulletin of Commerce has been published. *Ground Light on New Zealand* presents the potentialities of that country as the others in the series deal with South Africa, Australia and Canada. The book is obtainable from B.O.A.C. Airways Terminal, Buckingham Palace Road, S.W.1.

Fokker S.11 Instructor in the Air

Principal Features Described : Performance Assessment of Holland's New Basic Trainer

By WING CDR. MAURICE A. SMITH, D.F.C.

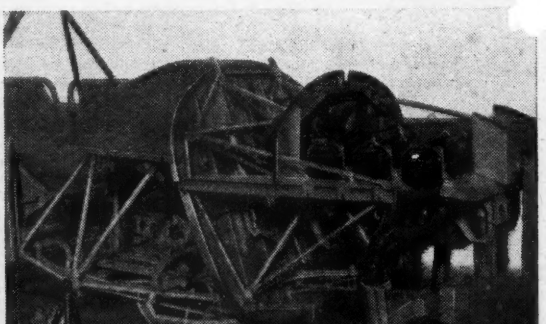
FLYING training, even in its early stages, means so much more to-day than mere instruction in the movement and effect of the controls of an aircraft that the design and equipment of modern trainers have assumed an importance hitherto reserved only for operational aircraft. The requirements of the new style basic trainer are now well known and the specification is a difficult one to meet, calling as it does for great strength, elaborate equipment, good aerobatic and slow-flying qualities—all these on modest power and with economy always in mind.

The Dutch Air Force is already closely associated with the R.A.F., and this will be increasingly true in the coming months. The same may be said of the other Benelux and Western Union countries. Not only does the Dutch Air Force have a common uniform with the R.A.F. but the first dozen Gloster Meteor 4s have now been delivered as part of common fighter defence policy. It is the intention for Fokker to build under licence Meteors and Sea Furies for both the Dutch and Belgian Air Forces. Belgium, to play her part, will build the Derwent gas turbines for these aircraft. Naturally, therefore, there will be some exchange of information on training and Holland's latest basic trainer, the Fokker S.11 "Instructor," follows along the lines laid down for R.A.F. counterparts. Mr. M. Beeling is the chief designer.

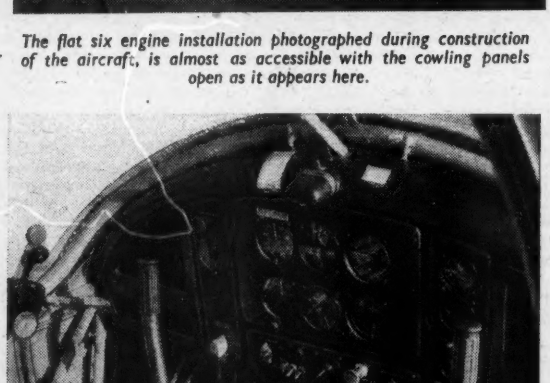
In some respects the S.11 primary structure falls short of R.A.F. requirements and, for example, rudder controls are 20 per cent low on strength as laid down in A.P.970. Again, the landing wheels do not comply with drag and side load figures. It is, however, a side-by-side two-, and possible three-seater capable of carrying all the equipment—radio, 2-stage amber, etc.—expected by a modern all-weather F.T.S. The S.11 complies with Dutch Airworthiness Regulations, 1940.

It may be remembered that on October 28th last year *Flight* published a full account of Fokker activities with particular reference to post-war productions, and that the salient features of the Instructor and a brief note of the flying qualities of the prototype were included. Very recently a visit was made to Schiphol and Ypenburg to see and fly the first production S.11 and, incidentally, its nose-wheel equipped alternative the S.12, the first of which is now completed. The chief visible difference between the S.11 prototype and the production version is the restyled empennage. The tailplane, still strut braced, has been lowered and a now-fashionable dorsal fin has been added. Fokkers have undoubtedly produced a trainer which is presentable in appearance and has many sound features.

Reference should be made to the accompanying drawing for details of structure and layout. The S.11 has a 190 h.p. Lycoming o-435-A flat-six engine and construction is all of metal. The control surfaces are fabric covered and the rudder and ailerons statically balanced.



The flat six engine installation photographed during construction of the aircraft, is almost as accessible with the cowling panels open as it appears here.

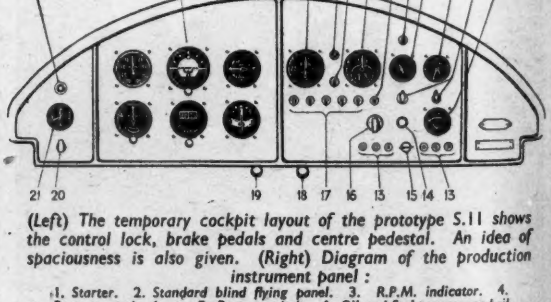


R.A.F. Pilots Impressed

A few weeks ago, when the S.11 made a semi-official visit to Hullavington, many R.A.F. instructors flew it and in general it was very well thought of indeed. It only remains now for Fokker designers to attend to the few small weaknesses, referred to in the following account from a pilot's (and ex-instructor's) viewpoint for them to have available for the Dutch and Dutch Indies Air Forces a most acceptable basic trainer. An initial production batch of 100 S.11s is in hand.

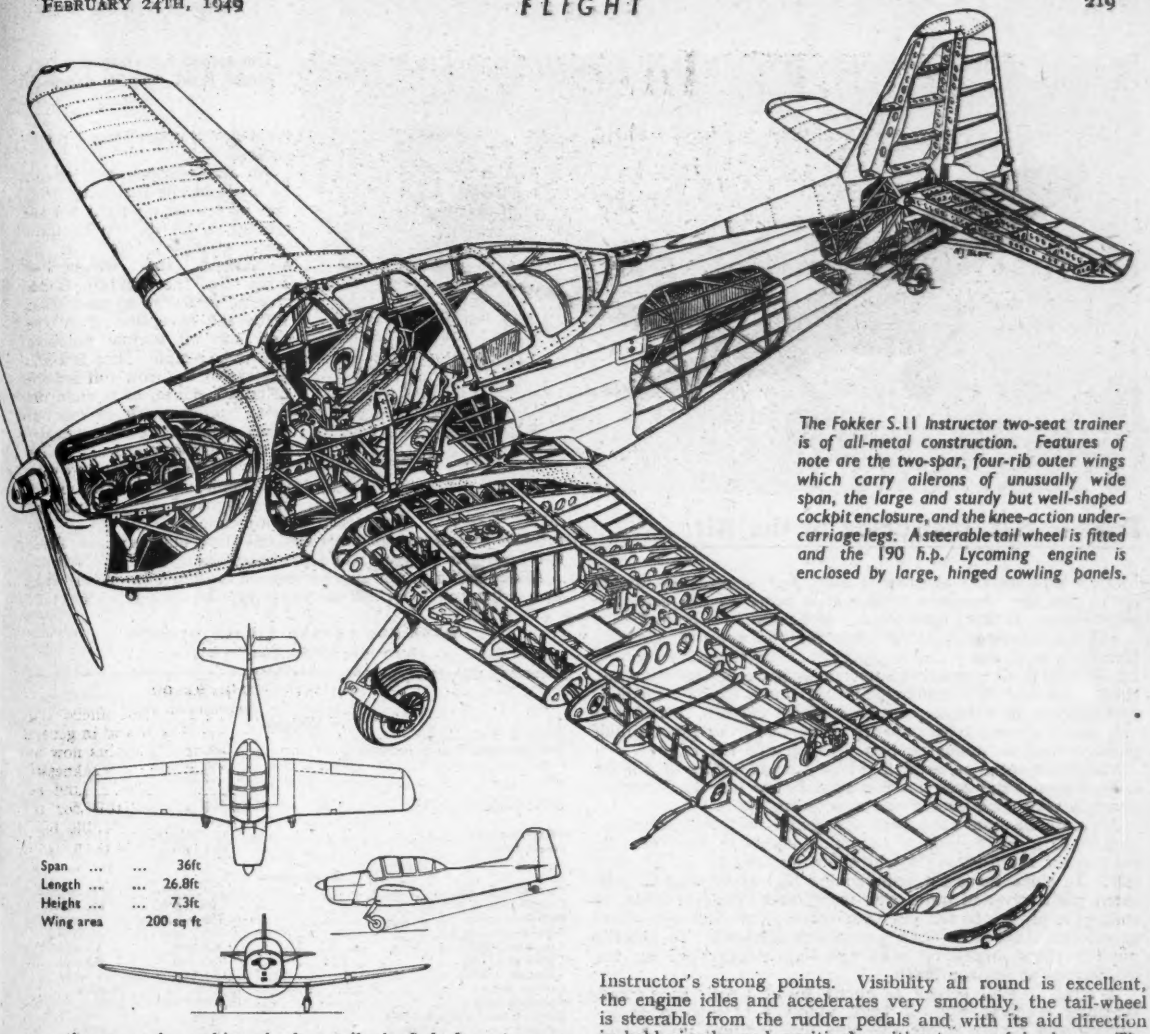
The principal improvements still to be made concern details of control arrangements, and at present the two-seat cockpit is a mixture of good and not-so-good features. For a machine of the Instructor's size the cockpit is particularly roomy, and provision has been made for the carriage of a third seat, clover-leaf style, and radio equipment. Rudder reach and seat height adjustments enable the pilot to settle in comfortably. View all round is exceptionally good, and the sturdy, rigid, sliding enclosure with catch placed top centre enables exit and entry to be simple actions. The moulded (later to be blown) curved windscreen is in two large panels and its top frame, braced from the panel bulkhead, is in the form of a solid-looking crash hoop. No provision is made for jettisoning the canopy and it is doubtful whether the aft travel of the sliding section gives sufficient open area for a quick emergency bale-out.

As in the Promotor, intelligent use is made of colour to denote the purpose of groups of controls; for example, all "taps" concerned with fuel supply are yellow and those used



(Left) The temporary cockpit layout of the prototype S.11 shows the control lock, brake pedals and centre pedestal. An idea of spaciousness is also given. (Right) Diagram of the production instrument panel :

1. Starter. 2. Standard blind flying panel. 3. R.P.M. indicator. 4. Battery warning lamp. 5. Battery switch. 6. Oil and fuel pressure and oil temperature gauges. 7. Starter switch. 8. Fuel contents indicator switch. 9. Fuel contents indicator. 10. Vacuum gauge. 11. Instrument light dimmer switches. 12. Ammeter. 13. Fuses. 14. Primer pump. 15. Fire extinguisher. 16. Ignition switch. 17. Electrical services. 18. Parking brake. 19. Tailwheel release. 20. Fuel cock. 21. Clock.



The Fokker S.11 Instructor two-seat trainer is of all-metal construction. Features of note are the two-spar, four-rib outer wings which carry ailerons of unusually wide span, the large and sturdy but well-shaped cockpit enclosure, and the knee-action undercarriage legs. A steerable tail wheel is fitted and the 190 h.p. Lycoming engine is enclosed by large, hinged cowling panels.

Span	36ft
Length	26.8ft
Height	7.3ft
Wing area	200 sq ft

on the ground—parking brake, tail-wheel lock, etc.—are green. The A.S.I. is also marked off in coloured segments to indicate the range of speeds within which flaps may be used and the normal to maximum speed range.

The instrument panel layout for production aircraft is illustrated. Presumably the present dual throttle and mixture controls, one pair on each cockpit side, will be rearranged to permit left-hand throttles for both pupil and instructor. There is a small central pedestal on which to mount one pair, but at present it carries the elevator trimmer, an unconnected airscrew pitch control, carburettor hot and cold air lever, and fuel "wobble" pump.

Two flights were made in excellent weather conditions from Ypenburg airfield near the Hague. The airfield is managed by the Frits Diepen group of companies who are also selling agents for all Fokker light aircraft, including the S.11 (see *Flight*, November 18th, 1948). Between the flights, during the lunch period, the fixed-pitch wooden airscrew was replaced by an automatic v.p. Aeromatic airscrew, which is offered as an alternative. The difference in performance with fixed and v.p. airscrew is confined almost entirely to take-off and climb. The Aeromatic airscrew allows the engine to develop maximum power at approximately 2,500 r.p.m. whenever the throttle is full open. Only at maximum level speed is this attained with the fixed-pitch airscrew, the climbing r.p.m. being about 2,180. The maximum speed is about the same with either airscrew, but when doing aerobatics the tendency to over-rev is removed with the v.p. version. There is a cost and a slight weight penalty to hold against the Aeromatic airscrew, but the big improvement in take-off and climb justify its fitment. For high-altitude or tropical operation the better take-off might be essential and, if need be, a rather more powerful engine could be fitted.

Control on the ground must be written down as one of the Instructor's strong points. Visibility all round is excellent, the engine idles and accelerates very smoothly, the tail-wheel is steerable from the rudder pedals and, with its aid direction is held simply and positively without use of brakes. The method of operating brakes is a matter of opinion and custom; those on the Instructor are toe-operated. They are of the Goodyear hydraulic single-disc type and were smooth but did not give the impression of being very powerful. This may be an adjustment matter. For take-off, landing or swinging round in a confined space the tail-wheel steering is disengaged with the aid of a knob on the panel, and rudder and one or other brake is used in the normal manner.

The springing of the undercarriage legs has been improved since the prototype was flown and is still pleasantly soft. It has been designed for a gross weight of 2,560 lb. An ultimate factor of 1.0 in a landing at 11.8 ft/sec vertical descent (energy-absorption case) and a factor of 1.5 in a landing at 9.85 ft/sec is quoted. Due to the rather unusual knee action design of the legs the case of the drag loads is not likely to prove important; however, the same cannot be said of side loads.

Good trainer qualities are noticeable when taking off. There is little tendency to swing and the machine is not very sensitive to tail level for leaving the ground; it nevertheless needs guidance from all three controls to take off correctly.

At about 70 kt with nose position quite high the Instructor climbs rapidly, achieving a rate approaching 1,000 ft/min when flown solo. There is little purpose in using the midway flap setting for take-off as lift is not increased to a worthwhile extent. Full flap gives a 40 deg. angle.

The Fokker company and their chief test pilot, Mr. Sonderman, have given a good deal of attention to the controls of the Instructor. The provision of a wide, short fuselage necessitated careful attention to rudder area for spin recovery. Stick-free stability is only just adequate, and it is probable that some pilots would prefer more, particularly in the lateral plane. Personally, I formed the opinion that the controls, particularly the ailerons, are on the heavy side. The static

The second S.11 trainer on a recent flight near the Hague.

Fokker S.11 Instructor in the Air . . . .

friction load on the ailerons is 2 lb, but it probably builds up in the air. In spite of the very large aileron area the effectiveness is not remarkable, although roll performance would be assessed as fairly high for the type of aircraft. Harmonization was quite acceptable. The elevators carry a tab which is at present insufficiently powerful to trim out stick loads and it is understood that this is being remedied. The absence of a rudder trimmer is not important and will only cause a very occasional leg ache, but from the training point of view it might be better to include the trimmer.

Maximum speed in level flight at 1,000ft settles at 105 kt indicated, and the nose position appears low like the Prentice, giving a very good view ahead and down.

Accurate medium turns call for gentle use of all controls, and there is no feeling of becoming stable in the turn, so here again the Instructor will show up well in its primary role. In steep turns the approaching high-speed stall is indicated positively and quite well in advance, and the effect of stalling is always to roll out over the top, not inwards, there to recover at once as stick pressure is released. To aid the pupil various angles of bank are lightly engraved on the windscreen at horizon level.

A straight stall occurs at about 50 kt I.A.S. at 3,000ft. Warning is given and, if held, about ¾ of a turn of incipient spin occurs before the nose finally drops into a spin proper. With flaps down the stall was similar and occurred perhaps 4 knots slower. Trial of 4 turns of spin (1,000ft lost) in each direction did not bring out any abnormal features, and recovery was rapid and positive. Two spins were sufficient for comfort, following as they did a good Dutch lunch and a spell of aerobatics, otherwise I would have tried opposite aileron and more turns. On the prototype it was possible in this way to make the normally steep spin rough and much flatter. Recovery was, however, just as positive, though a little slower under these circumstances.

All aerobatic manœuvres can be made in the Instructor with two up and at a weight not exceeding 2,395 lb. With three seats occupied, and at an authorized top weight of 2,560 lb, the aircraft is restricted in regard to aerobatics. With the exception of a true slow roll all normal practices are quite simple. The last 180 degrees of the slow roll is hard to hold because, as is often the case, rudder tends to run out apart from being rather heavy to use. Other pilots agree with me in this assessment and with the opinion that on aerobatics the weight of controls becomes rather wearing. The speed recommended is 120 kt at full throttle for all except rolls off and flick manœuvres. These two are made at 130 kt and not more than 70 kt respectively.

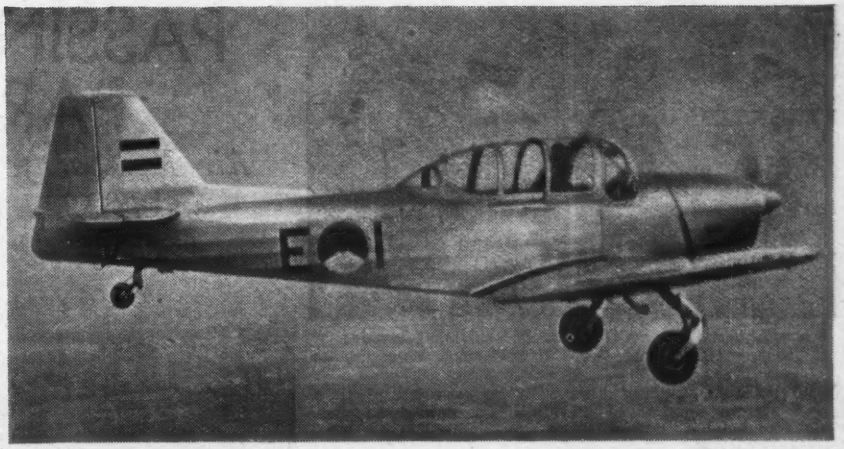
About half a dozen approaches and landings of various sorts were tried and I decided that the flaps are insufficiently effective and that sideslipping, except in the form of brief swish-tails, does not help. The flaps do produce some air brake effect which checks an otherwise long float period after the round out, and they produce a nose-down change of trim. Their area is small, the centre panel having been removed because of the interference it caused over the tail surfaces, and because the ailerons occupying such a large section of the wing trailing edge. It is the intention to increase the angular movement at the same time as the present inconvenient between-seat three-position flap-control lever is modified.

Glide approaches at about 65 kt give a convenient rate and angle of descent for instruction, and with full flap the slight increase in steepness enhances an already good view of the landing path. Rate of

DATA FOR FOKKER S.11 INSTRUCTOR
Lycoming 0-435-A Flat-Six Engine

	Fixed-pitch wooden airscrew	Aeromatic v.p. airscrew
Weights		
Empty with equipment	1,730 lb	1,750 lb
Two occupants with parachutes	400 lb	400 lb
Fuel	218 lb	198 lb
Oil	27 lb	27 lb
Gross weight	2,375 lb	2,375 lb
Wing loading	11.9 lb/sq ft	11.9 lb/sq ft
Power loading	12.5 lb/h.p.	12.5 lb/h.p.
Performance		
Max speed at S.L.	134 m.p.h.	134 m.p.h.
Cruising speed at S.L.	106 m.p.h.	106 m.p.h.
Minimum speed	58 m.p.h.	58 m.p.h.
Rate of climb at S.L.	730ft/min	905ft/min
Climb to 3,000ft	4.6 min	3.7 min
Climb to 6,000ft	10.6 min	8.3 min
Climb to 9,000ft	19.1 min	14.5 min
Service ceiling	13,100ft	14,500ft
Absolute ceiling	15,180ft	16,000ft
Take-off run, 5 m.p.h. wind	590ft	460ft
Landing run, 5 m.p.h. wind	490ft	490ft
Cruising range	390 miles	350 miles
Engine		
Max power	190 h.p. at 2,550 r.p.m.	
Cruising power	110 h.p. at 2,100 r.p.m.	
Specific fuel consumpt., cruising	0.53 lb/b.h.p./hr	

Aero-Holland Cessna Bobcats give a background to the S.11 parked at Ypenburg airfield.



The view from the cockpit is exceptionally good in every direction.

descent was about 1,200 ft/min and perhaps 300 ft/min less without flaps. The round-out and hold-off call for only small movements of the stick and here the fairly large stick load may be regarded as good.

On two simulated precautionary landing approaches it was possible to bring the Instructor in at a steady 55 kt I.A.S. with adequate control and quite a pronounced sink checkable quickly with an increase in throttle opening. I did not feel prepared to apply brake harshly to try a really short precautionary landing on my rather short acquaintance with the aircraft, but I was assured that there is very little tendency to nose over, the wheels being well forward.

During the later stages of the flight oil fumes from the engine were present in the cockpit. Not only should they be prevented from entering, but cabin ventilators should be provided. Tests have been made for carbon monoxide with negative results. In many countries a cabin heater would be required.

The fuel system calls for a word of description. There are two Goodyear Pliocel tanks of 34 gal total capacity, one in each wing root. Maximum duration is approximately 3½ hours. Fuel feed is with the aid of engine-driven pumps *via* flexible pipe lines and a four-way cock on the instrument panel. Cock positions are l., r., both or off. Electric contents gauges are provided and a wobble pump and a primer are to be found in the cockpit. (For the ambitious pilot it may be mentioned that the S.11 will fly quite nicely inverted if the priming pump is worked good and hard.)

A 12v 34 amp battery is fitted and the engine carries a 12v generator and starter. Night-flying equipment is also a standard feature. Before concluding, a brief note on servicing and accessibility must be added. All major components are detachable as units and are, of course, interchangeable between aircraft. Large inspection panels give access to the wings and forward fuselage. An engine change is a simple operation, a four-bolt mounting being provided. The control system can also be exchanged as a unit. The engine cowling is rather unusual and it will be seen that full access is given to the top half of the flat six unit by opening up the upper large cowling panel like a modern car bonnet.

Fokker Instructors are shortly to start out on demonstration visits and there is little doubt that such a practical trainer will be admired and well received.

Dimensions, weights and performance figures are tabulated, and the following information regarding design safety factors has been prepared by the manufacturers: According to Dutch requirements of 1940 ultimate loads equal 1.8 times the limit loads quoted. In the semi-aerobatic category (2,395 lb gross weight) the maximum limit load factor is 3.75 (c.p. forward) and the limit load factor, 3.0 at the design diving speed, 200 m.p.h. E.A.S. For comparison, in the non-aerobatic category (2,560 lb gross weight), the maximum limit load factor is 2.92 (c.p. forward), and the limit load factor 2.6 at the design diving speed, 187 m.p.h. E.A.S. The semi-aerobatic negative limit load factor is 1.7 up to a speed of 179 m.p.h. E.A.S. and is equivalent to meeting up and down, sharp-edged gusts of 13 ft/sec E.A.S. in a 60-degree dive at 200 m.p.h. E.A.S., or up, down and horizontal sharp-edged gusts of 24.5 ft/sec E.A.S in level flight at 144 m.p.h. E.A.S.

The wide, short undercarriage of unusual design gives the S.11 a good feeling of stability on the ground. Note the Aeromatic v.p. airscrew.

GLIDING LICENCES

THE British Gliding Association has been authorized by the Ministry of Civil Aviation to make an announcement on the subject of glider pilots' licences, certificates of airworthiness and ground engineers' licences. Of the outcome of the B.G.A.'s negotiations with the Ministry resisting the latter's desire to impose licences and certification systems on gliders, their pilots and engineers, the following details are given:

(1) Pilots of gliders not being flown for hire or reward will not be required to hold a licence. Nor will pilots of gliders belonging to a gliding club which are being used for instruction where both the instructor and pupil are members of the club.

(2) The gliders referred to at (1) will also be exempt from the requirement to be maintained in accordance with approved maintenance schedules and to be certified periodically as safe for flight.

(3) All gliders to have certificates of airworthiness issued by the Ministry and renewable annually.

(4) As an alternative to the certification of repairs, overhauls and modifications, by a licensed engineer, certification by an organization or person approved for the purpose by the Air Registration Board will be accepted. (This will mean in practice that some competent individual or individuals in each club will be made responsible to the A.R.B. for certifying work of this kind.)

(5) The pilot of an aeroplane towing such a glider will not be required to have his pilot's licence endorsed for towing.

PASSING-OUT PARADE

Air Member for Personnel Inspects 52nd Halton Entry

Illustrated by "Flight" Photographs

A handshake and congratulations for the apprentices awarded cadetships. Left, Sgt/App. Ash. Right, Sgt/App. Wilkinson.

THE high standard always to be expected of the Halton apprentices was fully maintained at the passing-out inspection of the 52nd Entry. Air Marshal Sir Hugh Saunders, K.B.E., C.B., M.C., D.F.C., M.M., was the reviewing officer.

Following the usual Halton practice, the whole parade was handled by apprentice N.C.O.s and the degree of efficiency attained was quite remarkable, having regard to the intensive technical training which occupies such a large proportion of the boys' time.

The parade was commanded by Sgt/App. J. M. Nicoll and Sgt/App. Murgatroyd was the parade warrant officer. Sgt/Apps. Ash and Wilkinson were the flight commanders of the 52nd Entry and the Junior Entries were in the charge of Cpl/App. Galley. Cpl/App. Warren commanded the Guard of Honour and Apps. Hayward and Rose were Drum Majors of the pipe and fife band and military band respectively.

At the prize-giving, held in the gymnasium after the parade, A. Cdre. J. F. Titmas, C.B.E., Commanding Officer of Halton, gave some interesting figures for the entry. Of the original intake of 120, six had been transferred to junior entries, two to other branches of the R.A.F., two were unable to sit for final examinations and a further 19 had been discharged for various reasons. The percentage of apprentices qualifying for L.A.C. standard, compared with the previous entry, rose from 1.1 to 7 per cent.

Much enthusiasm was shown for gliding and an average of 3.18 hours per apprentice was flown; 18 qualified for their "A" certificates. App. Lesley, at a civil school and at his own expense, obtained his "A" pilot's licence. Only two cadetships for commissions were granted; Sgt/App. M. J. G. Ash was awarded one in the Technical Branch and the second, in the Equipment Branch, was awarded to Sgt/App. K. J. Wilkinson.

Air Marshal Sir Hugh Saunders inspecting the two flights of the 52nd entry.

PRIZE WINNERS

Merit in all subjects	Sgt/App. M. J. G. Ash
Merit in general service efficiency	Sgt/App. J. M. Nicoll
Merit in educational subjects	Sgt/App. M. J. G. Ash
Merit in C.T.T.B. Practical Fitting Test and Crebbin Robinson Cup	App. R. G. Jarvis
Highest Average for Practical Fitting over 3 years course	Sgt/App. M. J. G. Ash
Merit in General Studies and winner of Elliott Memorial Prize, presented by R.Ae.S.	App. W. F. Eastman

Best Tradesman in Central Trade Test Board Exam.

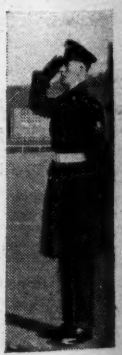
Fitter II.E	Sgt/App. K. J.Wilkinson
Fitter II.A	Sgt/App. M. J. G. Ash
Electrician	Cpl/App. P. N. B. Raggett
Inst/Maker	Cpl/App. J. J. Small
Fitter/Arm.	Ldg/App. A. D. Pitt

School Colours Awarded

SHOOTING—	RUGBY—	ATHLETICS—
Ldg/App. Botwright,	Cpl/App. Raggett,	Cpl/App. Dafter,
Ldg/App. Tomlinson	App. Mount.	Cpl/App. Raggett,
App. Carter.	BOXING—	App. McAndrew,
CROSS-COUNTRY—	App. Lowery.	App. Hayward,
Cpl/App. Dafter.	HOCKEY—	App. Barnes,
CRICKET—	Sgt/App. Murgatroyd,	App. Woodrow,
Ldg/App. Tranter,	Ldg/App. Finch,	App. Actill,
App.Webster.	App. Jarvis.	App. Bramley,
		App. Northcott.

Sir Hugh presented the prizes and in an address to the boys explained how the ex-apprentices from Halton fitted into the picture of a highly efficient and balanced air force. "The Halton spirit," he said, "is an enormous power for good, and you will do well to carry it with you into the wider and broader life which you are now about to enter."

Paying tribute to the work of A. Cdre. Titmas, the Aid Marshal broke the news that he would be leaving Halton to take up new duties as Senior Technical Air Staff Officer at Bomber Command H.Q. He will be succeeded by A. Cdre. N. Carter, C.B., D.F.C.



(Left) Air Marshal Sir Hugh Saunders taking the salute. With him on the dais are left to right: G/C. N. C. S. Rutter, Air Marshal J. Whitworth Jones, A. Cdre. J. F. Titmas, W/C. E. C. Badcoe and Air Vice Marshal L. G. Harvey. (Right) Sgt/App. J. M. Nicoll, Apprentice 1/C parade, reports to the Reviewing Officer.

By W. A. JOHNSON, M.A.

Multi-point "Dischargers" can be Designed to Suppress Radio Interference

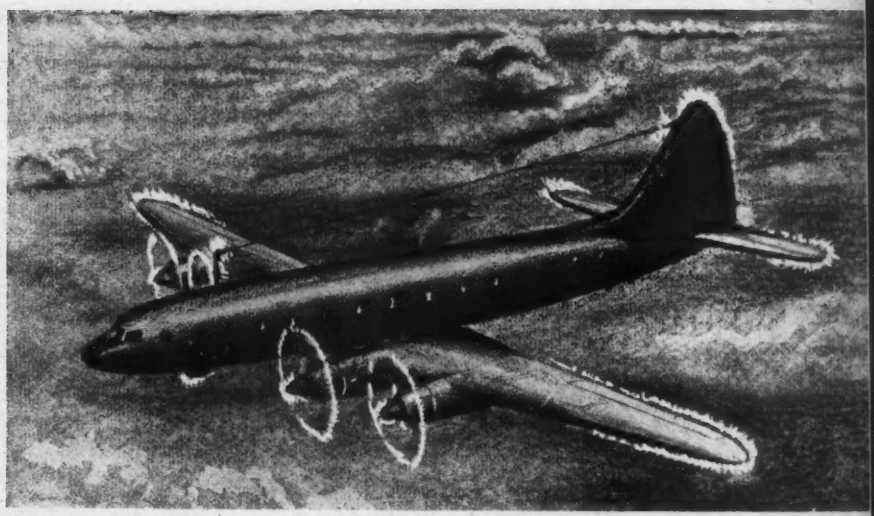


Fig. 3. In the absence of pointed dischargers, there can be a large build-up of charge on an aircraft

Static Discharges from Aircraft

THE effects of static discharges from aircraft, and lightning strikes to aircraft, have received increasing prominence with the revival of civil aviation since the war. The main phenomena observed include minor damage to aircraft structures, in the form of fused pits and holes in projecting parts such as wing tips; corona or glow discharges, and severe interference with the radio installation. Damage to engine bearings has been reported, but there is no evidence to show that this is caused by anything other than mechanical defects, or the results of lightning.

It is important to differentiate between lightning discharges to and static discharges from aircraft. The former is due to equalization of charges between clouds, or between cloud and ground, the aircraft forming part of the discharge path. It may be that in a region of a high potential gradient the aircraft may disturb the potential distribution sufficiently to initiate a discharge. The current flow from the aircraft structure may well be several hundred amperes, lasting for several milliseconds, and the amount of charge transferred may be large, up to 100 coulombs. While peak currents of 10,000 amperes are not unusual in lightning discharges, such large currents only last two or three microseconds. There are no known means of eliminating the hazard from lightning, other than by keeping away from dangerous areas. The fitting of radar-type cloud warning sets will be of great use in avoiding the worst storm centres.

Laboratory tests have shown that a spark discharge amounting to 2 coulombs is necessary to produce a noticeable pit in metal structures. Fig. 1 shows the spinner of an aircraft which was struck by lightning while towing a glider. The stroke was observed to pass from the spinner through the aircraft, tow rope and glider, and there is no doubt as to its authenticity. Fig. 2 shows an enlarged view of the pit marks on the spinner. It must, therefore, be concluded that all such damage is compatible with currents of the magnitude of lightning flashes, and are not due to corona discharges or "precipitation static."

Fortunately records show that the risk of fatal damage to aircraft by lightning is relatively remote, and the greater hazard is loss of radio communication due to corona effects, particularly in bad visibility conditions.

The other "precipitation static" phenomena are due to the equalization of charge between the aircraft and its immediate surroundings. Aircraft in general become charged in flight, due to such causes as friction between the aircraft skin and atmospheric particles of smoke, i.e., snow, dust, mist or salt, and to a lesser extent due to ionization of exhaust gases, and direct transfer of charge from raindrops and snow. The potential may reach several million volts and corona discharges appear on projecting portions of the aircraft. The total discharge currents will not exceed a few milliamperes, and the total charge on the aircraft never

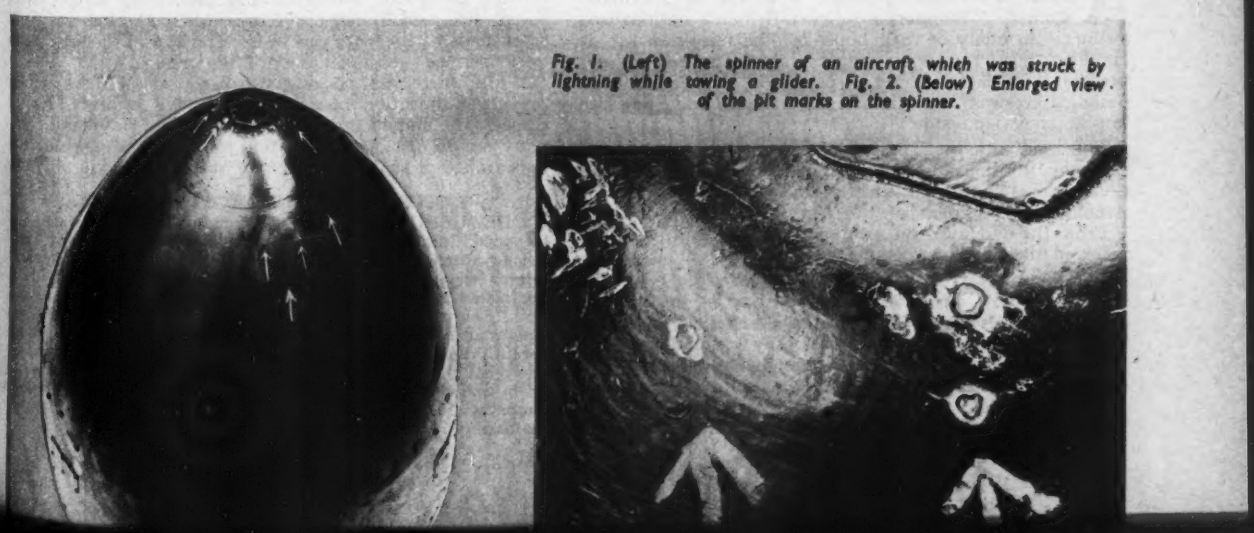


Fig. 1. (Left) The spinner of an aircraft which was struck by lightning while towing a glider. Fig. 2. (Below) Enlarged view of the pit marks on the spinner.

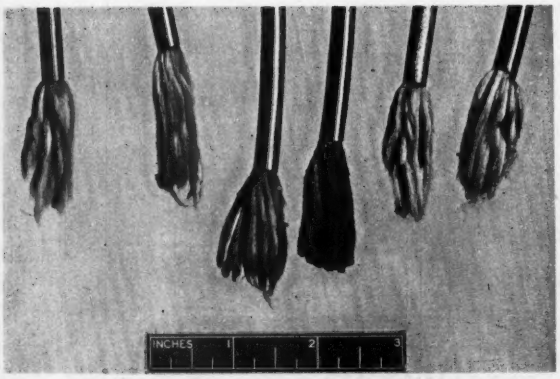


Fig. 4. The wicks on the right have deteriorated after 100 hours of flying. Those on the left have retained 60 per cent of their effectiveness

Static Discharges from Aircraft

exceed about one-tenth of a coulomb at any one time. The generation of charge may continue for a long period of time, depending on flight conditions.

The corona discharges generate radio noise; in fact, a discharge of only one microampere occurring from an aerial wire will put the radio receiver temporarily out of action. These effects have been well substantiated by research in the laboratory and field. The best published account will be found in Proc. I.R.E., April-May, 1947, "Symposium on Precipitation Static."

In any system devised to alleviate the effects of static discharges, two considerations are of paramount importance. First, the potential of the aircraft must be kept low so as to prevent corona discharge from the aerial itself, and, secondly, the discharge must be so controlled that there is no resulting radio interference.

It has long been known that sharp points will discharge at a lower potential than a rounded surface, and that an adequate number of such points at prominent positions of the aircraft would prevent a large build-up of charge on the aircraft, and minimize the risk of corona breaking out on the aerial (Fig. 3).

Unfortunately, discharges from metallic points produce large amounts of radio noise when discharging currents of useful magnitude. Installation of a large number of pointed wires at prominent portions of the aircraft will, therefore, reduce the average potential of the aircraft, but will produce some radio noise. It is found by experiment that this radio noise cannot be suppressed by inserting resistance in series with the wires, but is preferably done by using very fine points of high resistivity material. In any commercial application a compromise must be sought between the resistivity, fineness and durability of the individual points, and the prime and maintenance costs of the installation.

One solution is to impregnate cotton fibres with metallic deposits. These fibres are then woven into wicks, sheathed in plastic tubing about 10 inches long. A total of 12 to 18 wicks are mounted at the extremities of the aircraft, leaving two inches of cotton exposed. The metallizing process used ensures that it will not readily wash away, but there is a slow deterioration, and the wick requires trimming after about 100 hours' flying time. Fig. 4 shows six wicks, the two central ones being new and the metal deposit quite dark in colour. The two on the right are of poor quality, and the cotton is quite white after 100 hours' flying. On the left are two others of different manufacture, flown on the same aircraft, which have retained 60 per cent of their effectiveness. Trimming back the polyvinyl sheath to expose fresh cotton immediately restores the performance.

Wick dischargers can be manufactured to have any resistance between 10 ohms and many megohms, and experimental curves have been plotted relating total discharge current to radio noise for various resistivities. In general, the higher the resistance, the greater the discharge current before noise is noticeable. Below 30 ohms resistance, noise is excessive for one microamp. At 10,000 ohms, 70 microamps produce no noticeable noise, and at 100,000 ohms over 250 microamps can be dissipated quietly. This is probably a reasonable compromise value. Obviously too high a resistance would need excessive volts to produce a discharge, and the device would become ineffective. The permissible variation in resistance is, however, quite large.

In the installation of dischargers in aircraft it is most important that those fitted close to the aerial should be of a silent type. At wing tip positions, remote from the aerial, the noise produced is of less importance, and therefore if, for economic reasons, the silent type of dischargers cannot be fitted, and maintained, provision should be made for installing some type of multiple metal point discharger which, though noisy, requires little maintenance.

In conclusion, flight tests show that a real measure of protection against precipitation static is given by fitting dischargers, but for complete protection additional precautions must be taken in the design and treatment of the aerials themselves. There is no experimental or theoretical evidence to justify any hopes that these dischargers will give any protection from lightning.

The de Havilland Comet

American Journal's Intelligent Conjecture

AMERICAN *Aviation Week* of January 24th, 1949, contains the following reference to the de Havilland Comet: "Planners for Great Britain's nationalized airliners pin many of their hopes for the future on the de Havilland D.H.106 swept-wing transport powered by four turbojets. This still-secret 40-passenger airliner has been designed to cross the Atlantic in 6 hours, travelling 600 m.p.h. above 40,000ft."

This and adjoining paragraphs convey the impression that the information results from discussions which Air Commodore Sir Frank Whittle had with Mr. Milton W. Arnold, vice-president of the Air Transport Association.

From the de Havilland Aircraft Company, Ltd., we have received the following comment:

"A number of references to the projected de Havilland jet airliner D.H.106 have been appearing in the press in America and elsewhere. Most of these references have been based upon conjecture, and whilst they are not without a glimmer of truth here and there, the general effect of categoric statement at so early a stage in the project is inevitably misleading.

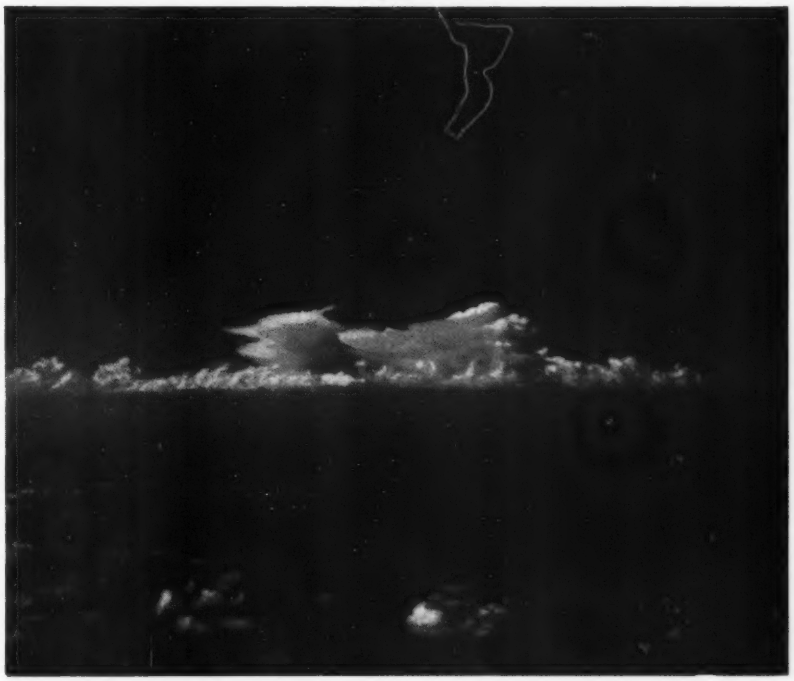
"The de Havilland Companies are particularly anxious that information should not be disclosed prematurely, tending to spread understandings concerning shape, size, speed, etc., which may prove incorrect in the light of decisions made as the work proceeds. The aircraft is not due to be in service on the lines until the 1950's."

While there are no official secrecy regulations which prevent publication of details of a civil aircraft, *Flight* respects the understandable desire of the de Havilland company not to disclose information too far in advance of the appearance of such a progressive and unorthodox aircraft.

LONDON-EDINBURGH SERVICE

SCHEDULED services between London and Turnhouse Airport, Edinburgh, will be resumed by B.E.A. on April 1st. All adjustments and extensions necessary to permit a regular winter service, as reported in *Flight*, January 15th, will be completed before next winter's schedules are introduced, and an all-year-round service will be possible. Sir Patrick Dollan, Chairman of the Scottish Advisory Council on Civil Aviation, recently announced that discussions were being held regarding the possibility of operating a feeder service linking Edinburgh with Aberdeen and Perth, and that recommendations would probably be considered by the next meeting of the Council in March.

Soaring Weather



Cloud banking up over the warmer land while the sea remains almost clear.

The Occurrence of Soarable Air Over the British Isles

By Jacques Cocheme

IN an article entitled "Soarable Air" (*Flight* 20/1/49) I attempted to detail the uses for thermal soaring of a layer of unstable air of varying depth. I now propose to discuss the occurrence of soarable air, the weather agents which bring it along, and the circumstances which attend its passage.

To this end I shall describe, briefly and in an idealised form, certain types of weather developments which commonly affect the British Isles. Amongst these the most important is, without a doubt, a succession of depressions which move in from the Atlantic and, travelling eastwards, give us perpetually changing weather. The general situation and its movements are as follows: the British Isles are never far from a boundary, roughly parallel with the equator, between cold air to the north and warm air to the south. "Waves" form along this boundary. At the crest of each wave, on the cold side, there is a depression or cyclone around which the wind blows anticlockwise. Opposite those, in the warm air to the south, the atmospheric pressure is high. The waves move from west to east and, assuming that they are passing somewhere between Iceland and Scotland, they bring winds from the westerly quarters, and a succession of relatively warm and cold air masses.

At the boundaries between the air masses there are belts of cloud and rain, the fronts.

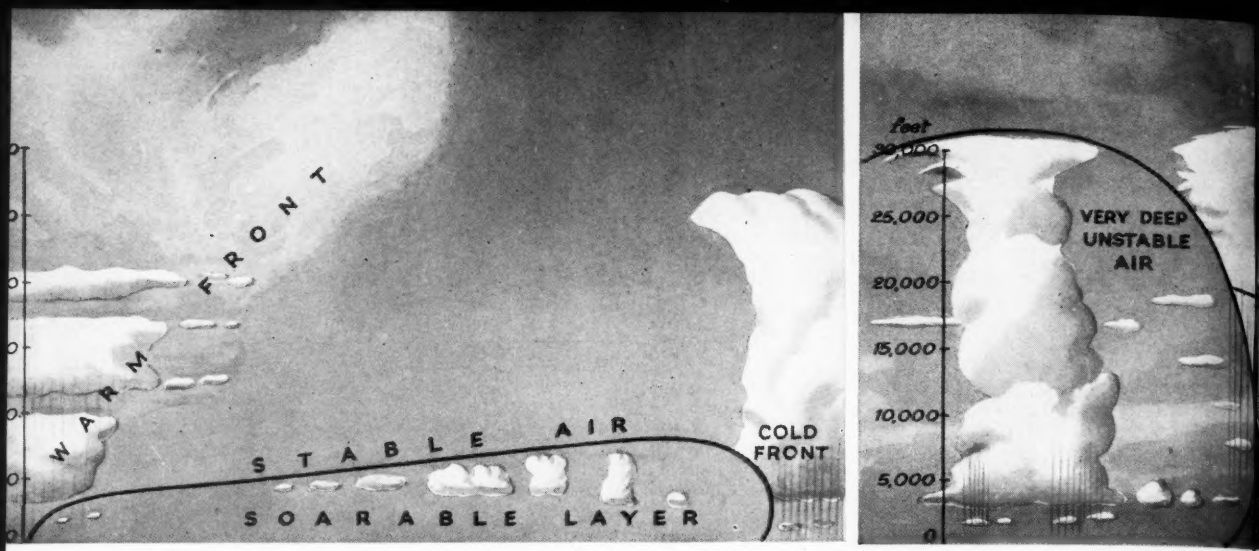
In soarable air, temperature falls off rapidly with height, thus making possible the prolonged ascent of thermal streams. This temperature fall is produced when air which is cold (because of its northerly origin), is heated at the surface by travelling over warmer regions. Each mass of potentially unstable air has a critical surface temperature above which convection will occur.

To the geographical way of reaching this temperature, which I have just mentioned, must be added the heating of the land by the sun during the day. Active convection raises the general temperature of a mass of air, and also the surface temperature necessary to generate ascent.

In the westerly type of weather under discussion, soarable air primarily occurs in the wake of the waves, and is heralded by a cold front, the transition between warm air from the Azores and cold air from Greenland, or thereabouts.

The temperature of the sea surface is very constant. It is not warmed much during the day, nor does it cool very rapidly at night. The average diurnal variation of the Atlantic off our shores is 1 deg. F. The yearly average variation is 10 deg. F. Consequently, in winter, and very often at night, the sea is warmer than the land. The soarability of the cold air which the westerlies periodically bring to us will, therefore, depend on how cold the air was originally, how much warming it has had from the sea, (that is, how roundabout and protracted its way over the Atlantic has been, how far south it has penetrated) and, finally, what heating at the surface it is likely to receive overland.

During the winter, unstable air coming to us from the Atlantic has been submitted to temperatures which, with the help of the Gulf Stream, are grouped around 50 deg. F. Unless its travel from the North has been very direct and



A pictorial cross section of the weather situation depicted below.

Soaring Weather . . . . .

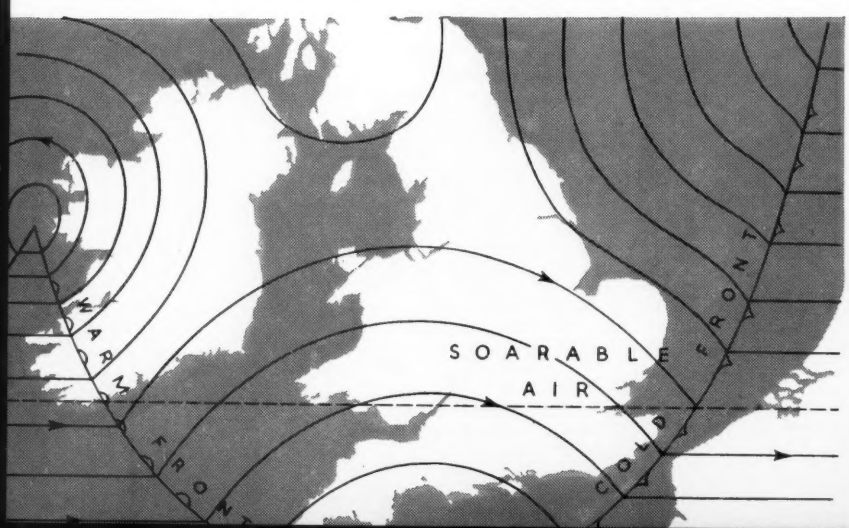
very fast, its capacity for becoming soarable at such temperatures has been completely fulfilled. And as the short day-heating of the land will hardly reach that temperature, especially after the cooling of clear frosty nights, such as are found in unstable air, convection will not take place, and soaring is impossible. The end of November, and the months of December, January and most of February, are a close season for thermal soaring so far as westerly, and practically every other type of weather, is concerned.

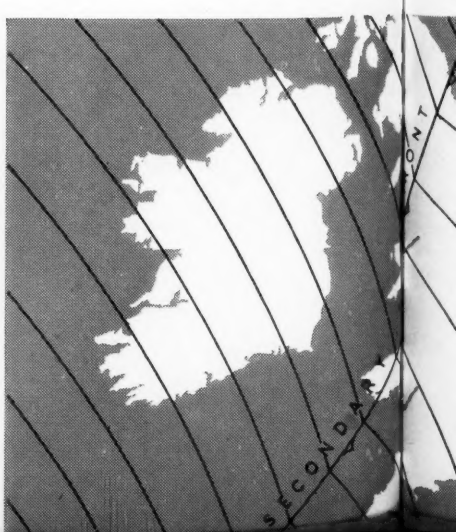
In the early spring, the eastern Atlantic of our temperate latitudes is reaching its lowest surface temperatures. Overland, on the other hand, as the days are growing rapidly longer, the warmth of the sun, rising higher and higher over the horizon, is being increasingly felt. Soon ground temperatures well in excess of the sea temperatures are reached for several hours in the middle of the day ; active convection arises.

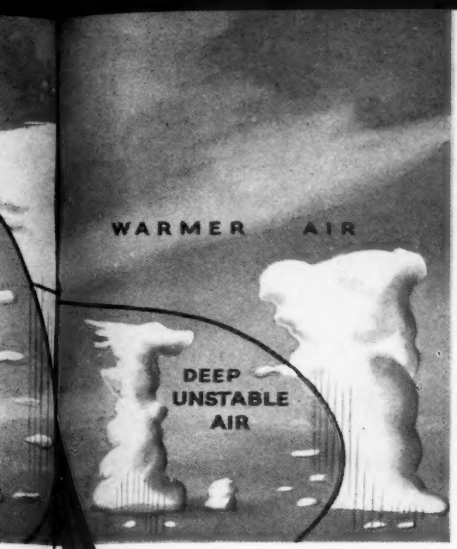
The soaring pilot who, for the last few week-ends, has been patiently cruising in front of hills with westerly slopes, and has only felt in the sunshine, amidst the steady hill lift, a few gentle, burbly, tremors, suddenly finds himself surrounded by substantial thermals and, muttering with excitement, regains that freedom of the air which has been obsessing him throughout the winter. It can thus be stated as a general rule that thermal soaring in westerly weather only becomes available again in the spring when ground surface temperatures well in excess of coastal sea temperatures are reached. In the south of England I should say that 55 deg F. is necessary. (In the warm air south of the frontal boundary, this temperature will, of course, be exceeded without the air becoming soarable.)

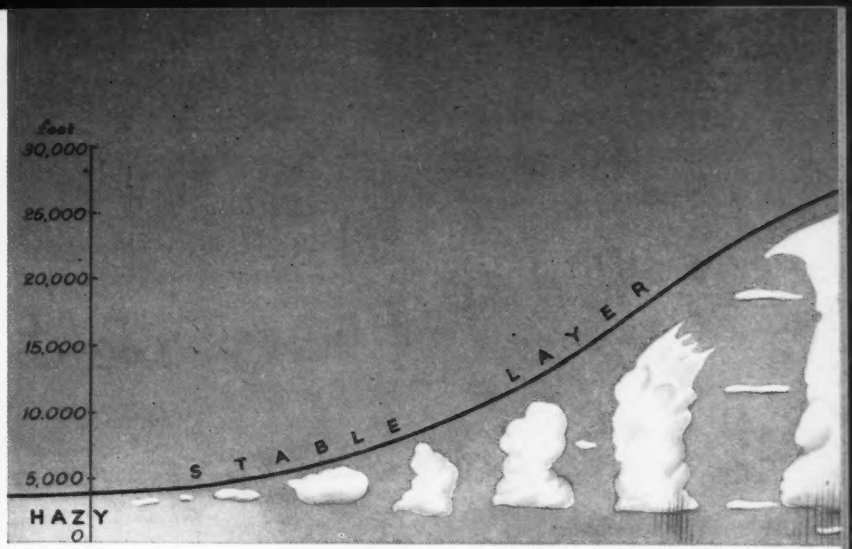
The depth of the cold air which penetrates behind cold fronts, in the wake of depressions, is extremely variable, and so is the length of time during which it is available for soaring over any given area. Equally variable are the high-pressure developments which usually adjoin the soarable layer and influence its depth and humidity.

A short-lived ridge of high pressure brings in a shallow layer of soarable air.









(Above, centre) Taller and taller cumulo nimbus clouds are forming at the fronts and in the unstable air. (Top right) As the depth of the unstable air is reduced so are the convection clouds within it.

All this can best be illustrated by describing the weather sequences of two extreme types. In the first, another wave closely follows that which has introduced the cold air. The frontal boundary does not recede very far south before it starts moving north again, as a warm front. Between the two fronts a small ridge of high pressure has developed, and passes across quickly.

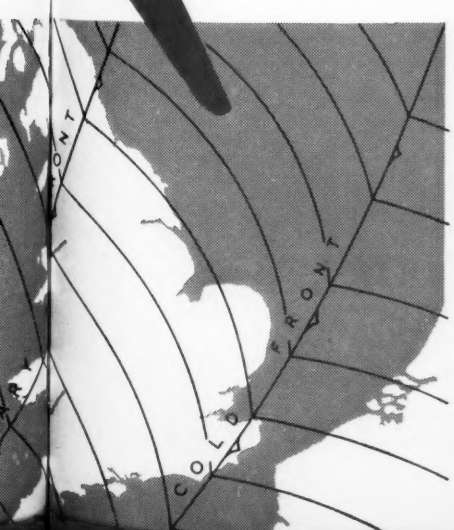
The successive symptoms of this type of weather will be described as they might be observed by a glider pilot living in London and fortunate enough to be able to go to the Dunstable Downs on that day. During the early hours of the morning gusty winds and heavy rain are experienced ; the cold front is going through. A first look at the sky reveals a confused picture, with much cloud in ragged fragments chasing along at all heights ; the air feels fresh. A little later it begins to clear, a steady wind is blowing from the west-north-west. Very obviously, by now a good gliding day.

There and then our man sets off for Dunstable under a clear sky. Beyond the Edgware Road the earth, its thirst well quenched, feels alert. As he nears his goal a few tenuous clouds are beginning to form, and in a short while the sky is studded with compact little cumuli. The wind is steady, and no time is wasted in getting airborne. Over the slope there is abundant, but rather broken, thermal lift. Gradually the clouds develop to their full height, say from 3,500ft to 5,000ft. Cloud streets are forming, and the wind becomes a little irregular in strength and direction as fair volumes are being displaced vertically.

Our man circles in substantial thermals whilst drifting away from the Downs, the contours of which are gradually erased by height. The way is open to Southend, Dover, or, with a skilful staggered flight, to Manston. But it is not intended to go cross country, and, leaving the lift, the sailplane starts gliding fast upwind. By three in the afternoon the clouds are definitely flatter, with a meaner look ; the subsidence above them is beginning to be felt. The wind is now westerly and a little steadier. The axis of the ridge is passing through. As the afternoon wears on, although there is still some lift at low height in the increased isolation, the thinning of the clouds becomes more obvious ; and the wind begins to back towards the south-south-west. In that direction banks of high clouds are seen. Overhead wispy mare's tails are beginning to be displaced by a fine veil of cirro stratus. There is a warm front on the way. This is the end of the soaring weather. It is time to land, but some very pleasant local flying has been enjoyed.

The other extreme case will need several days to run through the various phases of its

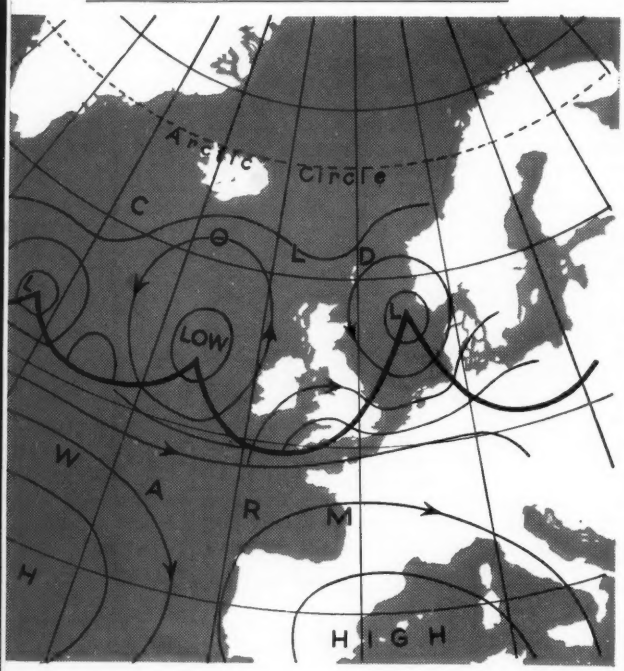
(Below, centre) Deepening unstable air invading the British Isles from the north-west. (Bottom right) The depth of the unstable air is gradually reduced by the formation and movement of an anticyclone.



metamorphosis. A deep depression, the last in a train of waves, passes north of Scotland and continues eastwards, sharply furrowing the shallow North Sea. Its cold front, moving fast, penetrates as far as the Mediterranean, where it causes the Mistral to blow down the Rhône Valley and heavy thunderstorms to occur over the mountains of Sardinia. Deep unstable air has invaded the land. As soon as the post-frontal respite is over, towering cunims are formed. (Their distribution over the sea, and over the land at night, varies, as I have tried to explain, with the time of the year, and with the dispatch with which the air mass has been brought from the northern refrigerators.)

Let us assume that the month is May, and that the air is stale enough not to ascend over the sea. Convection is, therefore, limited to the land during the day. Instead of being soon cut off from fresh supplies of cold air, the north-westerly stream is consolidated. The depth of the soarable layer increases to fill the troposphere, to the tune of several secondary cold fronts. The easterly movement of the pressure system appears to stop, and between the

Soaring Weather . . . . .



The Westerlies and the Polar fronts.

two enormous wind-wheels of the low pressure, now over Scandinavia, and of the high pressure centred over the Azores, soarable air continues to spill over the whole of Western Europe.

This is weather for top-drawer soaring: ascents in cunims, high-level cross-country, cold-front scraping, etc. Unfortunately, the pilot who has caught his initial thermal off the Dunstable Downs (which he has been quartering, unmercifully buffeted and periodically drenched), or from an aero tow at the Redhill Club, has not very far to go. Two hours' flying at the most will take him to the coast line. The wind direction might be right for a Channel crossing (this coveted achievement which remains the sole possession of Stephenson), but a lot of blind navigation would be involved, and the risk of rapid loss of height owing to icing and instrument failure is serious.

The *status quo* is maintained for several days, and he who means to use such weather receives abundant warning. At night, except at the cold fronts, convection ceases, the skies are cleared and the loss of radiant heat by the earth

A massive upward displacement of warm air.

numbs the air at its surface and slows the wind. The mornings are cold and slightly hazy. There is plenty of time to get ready whilst the sun is working its way through the surface inversion, and the first visible signs of convection are observed. In its first flush, lift appears to be omnipresent. For the would-be silver "C," this first batch of thermals is the most useful. In it, and with the help of the wind, he can cover the required distance in less than one hour.

Then, and for no known reason but that it happens to be happening, the anticyclone appears to grow, and its influence is felt. Subsidence begins to file down the depth of the soarable layer. The air no longer comes from Greenland, it has travelled round the high pressure The day-temperatures are higher, there is more sunshine. It is becoming relatively drier. Showers become less frequent, and they are confined to the afternoon; finally they cease altogether. The medium-sized cumuli form into beautiful cloud streets.

During this sequence soaring conditions to suit all tastes are met, and it is at the beginning of the improvement that cross-channel weather, as suitable as any, might well be found. The encroachment of the anticyclone continues. Soaring becomes unduly earthbound, and it is very hot under the plastic hood. Finally the air becomes completely sultry and laden with dirt. One waits in hope for a new large-scale draught of fresh air.

Another kind of weather situation, particularly interesting to pilots soaring from the London area, will now be outlined. During the winter a vast and permanent anticyclone forms over the cold land mass of Siberia. Extensions from it

A group of sailplanes circling in rising air.

Tall cumulo nimbus clouds pushing through a strato cumulus layer.

often bring us easterly winds, which are very cold because they have swept the icy plains of north central Europe. Most of our cold winter spells are due to these winds. As this freezing air has been circulating over increasingly warmer lands, and crossing the relatively warm North Sea, its lowest few thousand feet are unstable. It comes to us filled with low clouds and giving frequent snow showers. Soaring in it, theoretically possible, is arduous and uncomfortable, and, unless the air be particularly dry, dangerous as well.

It is, however, a common occurrence for these conditions to be repeated for a while during the spring. The result is very different then. This air is actively warmed at its base, and it is as unstable as can be. The fact that it was originally very cold causes it to be rather dry at the much increased temperatures to which it is being subjected, in spite of what moisture it may have picked up on the way. This means a fairly high cloud base and sufficient area of the ground left exposed to the sun for convection to continue throughout the day. Thus the south of England can be swept along its longest diagonal by a most useful soarable layer, and the London soaring pilot gets his chance of doing a gold "C" distance overland to Cornwall.

Mr. Philip Wills had observed the annual recurrence of these conditions, which he called "The Buchan Cold Spell." The 1938 vintage was strong and lasting, and he rode it to his gold "C" distance, the only British one to date, establishing at the same time a national distance record which still stands.

This easterly soarable layer in the spring often fails by being too shallow, thus making the going too precarious. So far from it being found too wet and cloudy, there is a danger of it being too dry, and animated with such a proportion of blue thermals that lift is found almost entirely at random, and consequently too seldom. Lastly, the wind direction may be quite right; it must blow from 070 deg., with only a tolerance of 10 degrees on either side.

In addition to, as well as within, the weather archi-types which I have described, a large number of different situations can be imagined which will bring soarable air to the British Isles. This large number nature can easily reproduce, and add a few unsuspected types. The riding of these apparently fanciful air currents is a fascinating task of exploration of a continuously changing landscape.

By Convair 240 to Holland

A Passenger's Impressions of the Journey and the Aircraft

AFTER flying in most types of airliner now in use on the European and American air routes no particular excitement attaches to one more flight from London to Schiphol. When, however, I heard that the K.L.M. afternoon service upon which I had reserved a seat would be flown in one of the newly introduced Convair 240s—"the world's most advanced medium airliner," the makers say—I felt a new interest in the journey at once, and forgot to feel sick during the forty-minute bus ride from Sloane Street to Heathrow.

Immigration and Customs authorities were in their best and most helpful mood, and a dozen passengers of various nationalities were quickly checked over and waiting in the departure lounge. The Convair, we learned, was very fast and, moreover, we could expect a good tailwind. I calculated that with the aid of the latest product of science and dollars we might recoup at least ten minutes on the flying time—nearly half as long as we waited in the lounge before departure.

On entering the Convair we were politely greeted in our respective native tongues by the two Dutch air hostesses. I found a window seat near the back and was surprised how full of seats the tunnel-like cabin seemed to be. I had rather hoped that this interior would be something new and refreshing. As it was I had a view of two horizontal "stove pipes" behind an engine, and the neutral coloured back of a seat.

The machine was started up and rolled out to the runway, there to rumble and shake while everything was checked. The take-off was quite exciting, and as the two big engines gave their all we leaped into the air in no time at all and quickly left the ground below. To distract our attention and stop our ears from "pinging" we first received newspapers and chewing gum. A map of the route and a card about the Convairs' augmented thrust, printed in four languages, were also provided. On the card it said that a whistling sound created by the velocity of the gas would not altogether escape our attention. "Even this extra hum is one of the many features of the Convair which will help to speed you to your destination at *300 m.p.h.*" About this time I took my first turn at underneath elbow on the central armrest of the pair of seats.

Small patches of London moved past below as we bounced along under cloud. We struck one terrific bump which brought several heads against the light luggage rack and caused a shower of folded rugs to descend. Between Gravesend and Rochester there was a roar from the engines and we scrambled steeply up through a gap in the clouds and continued there at about 6,000ft in smooth, clear air.

A snack was served soon after we settled down, and what with a tray, plates, coffee, books, a writing pad and a wee bottle of Apricot brandy and a big cellophane-covered apple which had been presented to each passenger, all propped on my knee, I felt as precarious as a showcase of china.

The noise at the back end of the Convair was considerable judged by modern standards, so I walked up to the front seats which were empty. Here the roar was replaced by a rumble and a little vibration could still be detected. The view out was almost entirely obscured by a huge slab-like engine nacelle covered with shiny, very smooth and well-fitted panels.

We were now well out to sea, and after starting off rather cold the heat in the cabin began to be noticeable and the windows steamed up. I returned to my seat at the rear, and after reading the captain's report which said, as far as I remember, 5,500ft, speed 235 m.p.h., E.T.A. 16.45, very windy, I filled in a Customs declaration form and accepted further gifts of Hopjes, cigarettes and K.L.M. book matches.

Often I have been bored when travelling by air, but not so on this Convair trip. I rubbed the moisture off the window and there was a flat expanse of country veined with canals below. The evening light made all water shine like a flame-coloured mirror.

We descended into bumpy air, there were whining noises under the floor, and the flaps went down. Without circuit or delay the pilot turned in, banking steeply, and with a gentle bump we were down at Schiphol. We had certainly "hummed" our way to Amsterdam in a hurry, for the whole flight had taken barely one hour.

M. A. S.

Jet Initiation

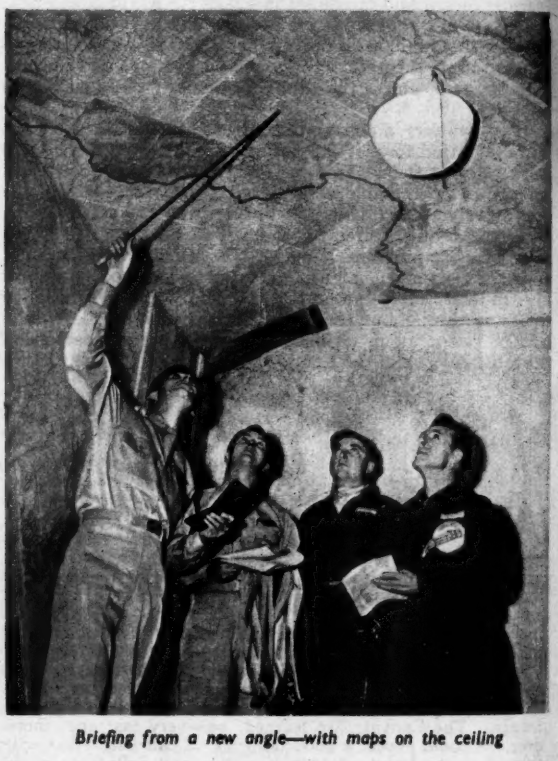
THE accompanying photographs show part of the preparation programme before a U.S.A.F. pilot makes his first flight in a Lockheed F-80, or, as an American phrase has it—"becomes a firecan jockey."

Of particular interest is the issue of those items of flying clothing now looked on by the U.S. as almost essential in the pursuit of high-speed flying. While the basic operation of handling a jet fighter follows normal practice, it is accepted by most people that the increasing speeds of modern fighters, throwing a progressively heavier strain on the human frame, will eventually demand provision of a type of "pressure-cum-g-suit." R.A.F. fighter pilots are at present operating without special clothing, but British flying suits incorporating "g-waistcoats" are in development stages.

There is also a strong possibility that a counterpart to the "man-from-Mars" helmets now worn by American service aircrews, as well as their test pilots, will make an appearance in this country. Reduction in the height of cockpit canopies, apart from giving a desirable decrease in drag, may be enforced by strength considerations, with the need to diminish, as far as possible, the area of transparent plastic. Helmets are then necessary to protect the pilot's head by absorbing bumps in rough air.

Lt. Price, a trainee fighter pilot, is congratulated after his first flight in a Shooting Star

G-suit and helmet are on the kitting scale for every U.S. fighter pilot



Briefing from a new angle—with maps on the ceiling

A blindfold cockpit check is a useful end-of-term test

CIVIL AVIATION NEWS

ANTIPODEAN: Operating between Rose Bay, Sydney, and the Solomon Islands, New Hebrides and New Caledonia, Trans-Oceanic Airways Pty., Ltd., employ a fleet of converted Sunderlands, one of which, the 36-passenger Australis, is shown above. The scene is Lord Howe Island, which Trans-Oceanic originally visited on an emergency food-carrying flight: they now operate a regular service.

B.E.A. Traffic Figures : I.C.A.O. and Charters : Air France Plans

SOUTH AFRICAN CHARTER ECHO

AN echo of Mercury Airways' differences with the Ministry of Civil Aviation last summer over the carriage of passengers between South Africa and England (reported in *Flight* of July 1st and September 2nd, 1948) was heard in London on February 17th when a charter firm was fined at Bow Street.

The company, Ackroyd's Air Travel, Ltd., was alleged to have carried passengers between Croydon and Le Bourget on six dates between September and November in connection with the South African services which Mercury Airways were terminating at Paris. Prosecuting counsel said that Ackroyd's had arranged transport and charged Mercury Airways an inclusive price. The case was found proved, and the defendants were fined £30 and 30 gns costs.

DAKOTA-ANSON COLLISION

UNTIL an official enquiry is held, it would be useless to speculate on the possible causes of the serious collision which occurred at 0945 hrs last Saturday at Exhall, 2½ miles N.E. of Coventry, in what are reported to have been cloudless conditions. The aircraft involved were a B.E.A. Dakota, G-AHCW, flying the 0905 hrs service from London to Glasgow, and a Royal Air Force Anson.

There were no survivors. In the Dakota were six passengers and the crew of four, the latter consisting of Capt. S. McDermott, 1st Off. G. D. Kershaw, R/Off. C. W. Stamper and Steward J. T. Smith. The Anson crew were S/L. A. R. Rush, Plt. II K. Suwala, Sig. II G. Tillon and Cadet Nav. J. Mackison.

B.E.A. OPERATIONS DURING 1948

TRAFFIC figures for B.E.A. operations during 1948, given in the table below, show substantial increases in passengers, freight and mail carried and passenger miles flown. The number of passengers surpassed 1947's total by more than 100,000, freight by more than 1,500 tons and mail by just over 1,000 tons. The increase shown in passenger miles was over 42,000,000 miles. The B.E.A. fleet, which now consists of 33 Vikings, 24 Dakotas (including four freighters) and 18 Rapides, flew 12,345,309 miles, an increase of more than 806,000 miles over the previous year.

During December, 1948, B.E.A. flew 900,847 miles, a record increase of more than 113,000 miles over the figures for the corresponding month of the previous year. More than 50 tons of excess baggage, 137 tons of mail and 388 tons of freight were carried during the month and the number of passengers carried rose to 28,556 compared with 26,240 during December.

I.C.A.O. STANDARDS FOR NON-SCHEDULED FLIGHTS

TECHNICAL standards to cover international flights by aircraft not regularly engaged on scheduled air services are being drafted by the International Civil Aviation Organization's Operations Division, now holding its third session in Montreal. Operational standards for airliners flying schedules routes have already been prepared but there is an increasing need to draft operational standards for non-scheduled international operations because of differences in working conditions created by their nature. Present I.C.A.O. operational standards require each airline captain to have flown over his scheduled route and to have made landings at every regular and alternate airport along the route, before he takes command. It is impossible to apply such a regulation to charter aircraft which one week may carry passengers to South America and the following week may fly cargo to the Far East.

Other subjects to be considered include procedures to be followed in loading aircraft. Present aircraft design takes into account varying temperatures, runway length, aerodrome height above sea level and physical obstacles surrounding an aerodrome to ensure complete safety of operation. These factors must also

B.E.A. OPERATIONS DURING 1948

	U.K. Services		Continental Services		Total Services	
	1947	1948	1947	1948	1947	1948
Distance flown (miles)	6,637,578	5,359,087	4,901,483	6,986,222	11,539,061	12,345,309
Passengers carried	329,325	368,755	133,610	196,655	462,935	565,410
Passenger-miles flown	44,287,274	56,754,723	64,035,423	93,885,906	108,322,697	150,640,629
Excess Baggage (tons)	203	292	411	554	614	846
Mail (tons)	608	1,123	586	1,154	1,194	2,277
Freight (tons)	667	823	1,332	2,761	1,999	3,584

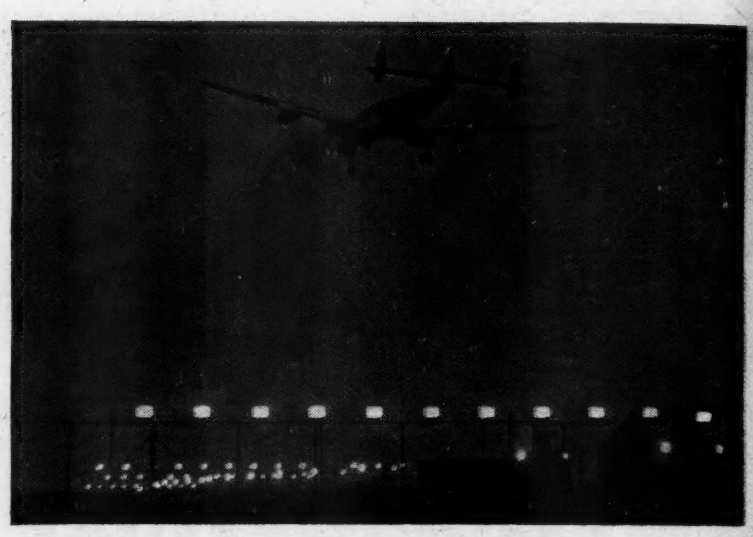
Civil Aviation News . . .

be taken into consideration when loading an aircraft before flight. The meeting, which is attended by representatives of 23 nations and is expected to continue until the beginning of March, is under the Chairmanship of Mr. R. D. Hoyt (United States); the Vice-Chairman is Mr. A. Heum, of Norway.

AIR FRANCE PLANS

ACCORDING to figures compiled by the U.S. Civil Aeronautics Board, Air France has the longest route mileage airline in the world with 64,560 unduplicated route miles, covering 70 countries and Colonies on five Continents. This figure will be increased still further when the Constellation service between Paris, New York and Caracas is opened shortly.

Summer schedules announced by the airline will include services to Paris from Glasgow, Belfast, Birmingham, Manchester and London with connections in Paris for Switzerland, Italy, Corsica, North Africa, Morocco, Majorca, Spain and Portugal. Seven services daily will operate from London to Paris and one each to Nice, Dinard and Deauville. A daily service will be operated between Manchester and Paris and the new Birmingham-Paris service will operate on alternate days with B.E.A. Services between Paris and Glasgow, Belfast, London and the London-Riviera route will be operated with four-engined Languedocs.



CONNY BY GAS LIGHT: A Constellation, about to alight at London Airport, coming in over the approach lighting system. Temporary threshold lighting has been installed at both ends of runway 100/280 deg. The system is a modification of the Farnborough installation described in "Flight" of April 29th, 1949.

ISLE OF MAN PROSPECTS

DISCUSSIONS recently took place between the Minister of Civil Aviation and a deputation from the Isle of Man, consisting of the Lieutenant-Governor, A.V-M. Sir Geoffrey Bromet, K.B.E., C.B., D.S.O.; the Chairman of the Isle of Man Airports Board, Mr. T. C. Cowin; and Mr. G. Griffiths, the Airport Commandant of Ronaldsway Airport. Plans for B.E.A. services to the Isle of Man during the summer were discussed and Lord Pakenham said that in view of the heavy losses incurred last summer, considerable reductions in the service were inevitable. Services would be operated between Liverpool and the Isle of Man; Liverpool, Isle of Man, Belfast; and a week-end service between London and the Isle of Man. He was anxious that the Island should be served by enough flights to ensure its well-being and said that sympathetic consideration would be given to any recommendations from the Air Transport Advisory Council regarding private companies who wished to operate scheduled services to the Island. The last date by which such applications should reach the A.T.A.C. had been altered from February 16th to February 23rd to give prospective operators time for further consideration in view of B.E.A.'s plans.

BREVITIES

IN answer to a question in the House of Commons, Mr. G. S. Lindgren, Parliamentary Secretary to the M.C.A., stated that B.E.A. had no intention of operating a service between London and Aberdeen during this year.

* * *

B.E.A. have announced that a Charter Section has been opened in Room 21, Dorland Hall, Lower Regent Street, S.W.1, under the supervision of Mr. G. H. W. Wharton, the Charter Superintendent.

* * *

With effect from March 1st, all aircraft flying by night in control zones in the United Kingdom must fly under IFR. Where a full 24-hour watch is not maintained IFR is to be maintained during the hours of watch at night. This announcement is made by the M.C.A. in *Notice to Airmen* No. 486.

* * *

Air France introduced an increased service to the Riviera on February 18th and are reserving ten extra seats on the Languedoc 33-seaters for passengers from the U.K. After April 22nd the service will return to normal. The service operates from Paris to Nice and takes 2 hours 45 minutes; rapid road transport is arranged from Nice to Monte Carlo, Mentone, Antibes and Cannes.

* * *

Delegates from the United Kingdom to the Southern Africa Air Transport Council at Pretoria on February 22nd, left Southampton on February 15th by B.O.A.C. Solent flying boat on the scheduled service to Johannesburg. The delegation was headed by Sir George Cribbett, K.B.E., C.M.G., the Deputy Secretary of the M.C.A., and included Major J. R. McCrindle, O.B.E., Managing Director, External Affairs, B.O.A.C.

* * *

Appointments to fill the vacancies on the I.C.A.O. secretariat, previously referred to in *Flight*, have now been announced, and include three citizens of the U.K. They are: Deputy Chief, Air Navigation Bureau—G/C. Frank Entwhistle, B.Sc., previously Chief of the I.C.A.O. Meteorological Section; Technical Officer, Accident Investigation Section—G/C. J. A. Newton, A.F.C.; Assistant to Secretary General—Mr. John Hutchinson.

* * *

Sleeper fares on the Panagra night flights between Miami and Buenos Aires have been reduced from $125 to $45. This route is operated by DC-6 aircraft and the timing of the flights has been arranged to allow 11 hours uninterrupted sleep for the 12 passengers occupying sleepers and 40 passengers in reclining seats in the forward cabin.

* * *

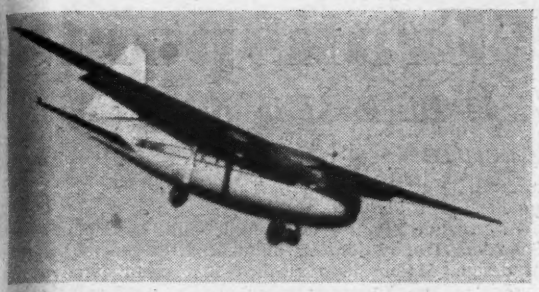
It should be made clear that the Indian traffic figures given in a recent issue referred to the operations of Air-India, Ltd., and not to Air-India International. Also, though no passengers were carried during the first year of operations, the services transported regular loads of freight and mails.

* * *

Starting on March 17th the Air France service from Paris to Buenos Aires is to be doubled and will operate twice weekly with Lockheed Constellations carrying 39 passengers. The service will leave Orly Airport, Paris, at 10 a.m. on Thursdays and Sundays, arriving in Buenos Aires at 5.30 p.m. on Fridays and Mondays. Return aircraft will leave Buenos Aires on Sundays and Wednesdays, arriving in Paris the following day.

* * *

During a recent visit to B.O.A.C. engine overhaul factory at Treforest, Mr. G. S. Lindgren, Parliamentary Secretary to the M.C.A., saw one of the first Cyclone engines to be overhauled since the transfer of the Maintenance Base from Dorval to Filton. He was accompanied by Sir George Cribbett, Deputy Secretary of the M.C.A., and conducted over the factory by Mr. J. Robson, Manager of the B.O.A.C.'s Repair Division, Mr. C. E. McGibbon, the Deputy Manager, and Mr. G. A. Hummerstone, M.B.E., Works Manager at Tre-



A FRENCH FREIGHTER: The Fouga CM.100, referred to in Flight, February 17th, which is now undergoing flight trials, has a cargo capacity of two tons at a gross weight of 16,000 lb. A passenger version, the CM 101, is being assembled.

forest. About 130 engines and 70 airscrews are overhauled at the factory each month, working for the M.o.S., B.E.A., and other concerns as well as B.O.A.C.

* * *

During his tour of London and Northolt Airports recently, M. Christian Pinaud, French Minister of Transport, Public Works and Tourism, stated that some of the equipment was unknown in France. After inspecting passenger buildings at London Airport, the French Minister, accompanied by Lord Pakenham, the Minister of Civil Aviation, flew in a Dove belonging to the M.C.A., and made a radar landing at Northolt.

* * *

Representatives of 21 nations met at the Inter-American Tourist Congress at Bariloche, Argentina, from February 16th-24th and discussed plans to facilitate tourist travel between the Americas, and the introduction of standard tourist rates. Panagra's Sales Manager for South America, Mr. Granville B. Bourn, was appointed official delegate to the Congress for I.A.T.A. and the Air Transport Association.

* * *

At a meeting of the Joint Air Transport Committee of the Association of British Chambers of Commerce, the Federation of British Industries and the London Chamber of Commerce, Mr. J. Vivian Holman succeeded Captain A. G. Lamplugh as Chairman of the Committee for the current year. The Deputy Chairmen for the year are Mr. Leslie Gamage, M.C., and Mr. J. S. Wills.

* * *

In reply to a question in the House of Commons by a Westmorland M.P., Mr. G. S. Lindgren, Parliamentary Secretary to the Ministry of Civil Aviation, said that B.E.A. did not propose to operate a service between London and the North of England during the coming year, nor could he say whether any such service was envisaged for the future. Any private company wishing to operate a service would now be able to apply for permission to do so.

* * *

The Minister of Civil Aviation has announced, in Notice to Airmen No. 477, that the Decca Navigator has now been added to the navigational aids accepted as complying with Air Traffic Control requirements. The standard airborne equipment is the Mk. VI receiver, incorporating Lane Identification facilities.

* * *

As part of the Government scheme to speed up the passages of wives and families of Servicemen to the Middle East, Airwork, Ltd., has received a contract to carry families to the Middle East by air. The first aircraft, a Viking, left Blackbushe Airfield on February 14th carrying 16 wives, 11 children and 9 babies. Previously, many families had made their own arrangements for reaching the Middle East and the Government had refunded a proportion of the fares involved, up to the normal cost to the Services of surface transport.

FROM THE CLUBS

NOT satisfied with a glider, Mr. Sidney Bichan, a farmer and a member of the Orkney Flying Club has now acquired an Auster. He intends to use his aircraft for flying day-old chicks between the Islands and the mainland and estimates that he will be able to carry about £20 worth of chicks on each flight and cut down the casualty rate caused by waiting for sea transportation.

* * *

DESPITE the unsettled weather during January, members of the Herts and Essex Flying Club managed to log 103 hours flying and the instructors were kept fairly busy. On February 20th a fancy dress dance was held in the clubhouse and 150 members spent a very enjoyable evening. There are now 320 flying members of the Club and 50 non-flying members, and the fleet consists of four Tiger Moths, three Austers, three Rapides and a Proctor.

* * *

JUST under 2,000 flying hours were recorded by members of the Rochester Flying Club during 1948 and during January this year the 50 active flying members logged over 100 hours. A satisfactory number of "A" licences and one "B" licence were obtained by members during last year and instruction has been continuing. At present the Club is operating with three Tiger Moths, three Magisters, one Auster and a Proctor. The annual dance will be held on Friday, March 11th, at Rochester Airfield.

* * *

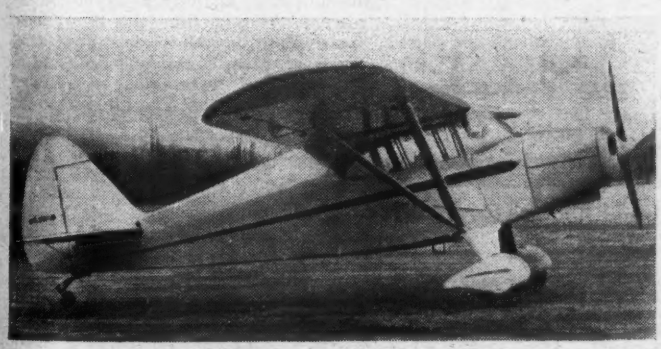
TO celebrate the 21st anniversary of the Northamptonshire Aero Club, an air display will be held at Sywell on May 21st. Full R.A.F. support has been promised for this, and it is hoped that some of the latest and fastest jet aircraft will be demonstrated. The Rt. Hon. Lord Pakenham, Minister of Civil Aviation, and Mr. G. S. Lindgren, Parliamentary Secretary to the M.C.A., have promised to attend. A number of pilots who attended the first air pageant in 1928 also intend to be present. There are high hopes that several new helicopters will be demonstrated, and adequate accommodation will be provided for the public to see the display.

* * *

THE latest addition of the well-known family of Piper aircraft is the Piper Clipper, a photograph of which appears on this page. Its forerunners, such as the Cub and Super Cruiser, have gained, and still enjoy, considerable popularity in club circles both in this country and in Holland and Belgium. The 1949 Piper Clipper is claimed to be the lowest-priced four-seater aircraft on the market, being priced at 2,995 dollars, the equivalent of about £750.

The Clipper has a relatively small wing span of 29ft 3in which has been introduced as a result of experience during the war on a number of standard Cubs which were used for special purposes with 3ft clipped off each wing panel. Take-off, climb and other performance characteristics have been found to be unimpaired by the reduction of span and cruising speeds and handling characteristics have been improved.

Empty weight of the Clipper is 850 lb and payload 800 lb, thus the useful load is 94 per cent of the weight empty, an unusually high ratio for small aircraft. The Clipper is powered by a four-cylinder 115 h.p. Lycoming O-235-C1 engine to which an electric starter and generator are fitted as standard equipment. A 12-gallon fuselage tank and 10-gallon wing tank give a cruising range of nearly five hours. A stall warning indicator is fitted as standard.



LATEST PIPER MODEL: The 1949 "Clipper," details of which have just been released, has particularly pleasing lines, as this photograph shows. The 115 Lycoming engine gives it a cruising speed of 112 m.p.h. with a maximum of over 125 m.p.h. The Clipper's range at cruising speed is 480 miles and the stalling speed is 50 m.p.h.

Records and Transports

Some Interesting Facts and Views Disclosed in Brancker Memorial Lecture

THIS year's Brancker Memorial Lecture was delivered by Major R. H. Mayo, O.B.E., to the Institute of Transport on February 14th. The lecturer had chosen the title "Oft the Record," and attempted to show the effect which world's records have on the development of air transport.

Before turning to his main subject Major Mayo recounted an amusing happening which was typical of the late Sir Sefton Brancker. In 1914 the Royal Aircraft Factory (as it then was) at Farnborough had with great trouble designed and built an inherently stable biplane, the B.E.2C. Major Brancker (as he then was) descended on Farnborough from the War Office and insisted on trying the precious B.E.2C. "Rumour had it," Major Mayo said, "that his piloting skill was not quite up to the high standard of his courage." After a relatively successful flight (during which the claim for inherent stability was obviously fully tested!), Brancker was seen to be approaching the airfield too high and too fast, but evidently determined to land. He did so, the first contact with the ground being made 100 yards from the limit of the airfield. There were no wheel brakes in those days, and the nose of the machine hit the trunk of a tree. The machine was smashed, but Brancker stepped out of the wreckage, wiped the oil off his monocle and said: "Yes, she's splendid; we will have some more like her."

Major Mayo then outlined the growth of aircraft performance in world-record attempts covering speed, over a straight course, distance in a straight line, distance in a closed circuit, and altitude. The growth is illustrated graphically in three charts.

In Fig. 1 it is seen that the curve "A," which includes the jet engine period, holds remarkably close to the straight line "B." This did not imply that the sonic barrier is a myth, but it looked as if the record has been gathering momentum to leap the barrier. The curve relates to the low-altitude speed record. If and when it became possible to time the machines at heights, a record speed of 1,000 m.p.h. or more might become a justifiable forecast instead of a mere sensational guess.

The curve of Fig. 1 clearly showed the stimulus of the Schneider Trophy Contests in the late 1920s and early 1930s.

Fig. 2, progress of the straight-line distance record, does not follow the straight line as closely as does the speed-record curve, but the line "B" gives the general trend, and the latest rise is the steepest of the whole period.

In the altitude record the free balloon has so far remained unchallenged. It holds the present record by a comfortable margin, but Major Mayo thought it would be beaten by heavier-than-air aircraft. Curve "A" in Fig. 3 indicates that there is a practical limit ahead.

As to how the speed record, and particularly the Schneider Trophy Contests, influenced the general progress of design, Major Mayo recalled that clean aerodynamic design of the Supermarine seaplanes, progressively improved in the S.5, S.6 and S.6B, led to increased performance and to a better understanding of the importance of streamlining. The power of the Rolls-Royce "R" engine was gradually increased by greater boost and by certain improvements. That engine was not suitable for general service, but it led to the series of Merlin engines. It was doubtful that we should have had the Spitfires and the Hurricanes but for the Schneider Trophy Contests.

A very different type of contest was the England-Australia race of 1934. It was won by a de Havilland Comet specially designed for the race, and the influence of the Comet was still plainly discernible in the latest D.H. post-war military and commercial designs. The Douglas DC-2 was second, and led to the DC-3, which for 12 or 13 years has been more widely used than any other type.

Closed-circuit Speed

Speed over a closed circuit provides a severe test of general airworthiness, and John Derry's record in a D.H. 108 had advanced the general theory and practice of swept-back wings and gave great hopes for the D.H. 106 airliner, of which the 108 was the forerunner.

In the field of helicopters, too, the speed record was of value. In the case of the Fairey Gyrodyne, a new location of the counter-torque airscrew had effected a great improvement in speed, and the record demonstrated the success of this breakaway from accepted practice. This would lead to further attempts and to fresh advances.

The altitude record provided a particularly good test of all-round performance. The qualities which enabled Cunningham to set up a new record last year in a Vampire had been inherited by the D.H.108 and would no doubt reappear in due course in the D.H.106 airliner. And in reaching the 60,000 ft. level Cunningham also explored the more practical levels of 30,000 to 40,000ft at which the turbojet airliners now under development will soon have to operate.

Major Mayo drew attention to the way in which the speed record had swung from landplanes to seaplanes and back to landplanes again, and explained the reasons. For a time the flying boat appeared to be almost dead, but a revival was already taking place, and as size increased there must be a reversion to flying boats. The SR/45 140-ton

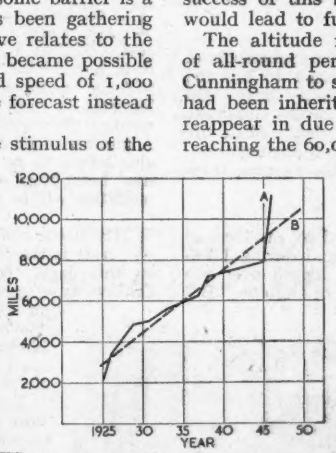


Fig. 2 (above). The distance record varies more than the speed record from the straight line.

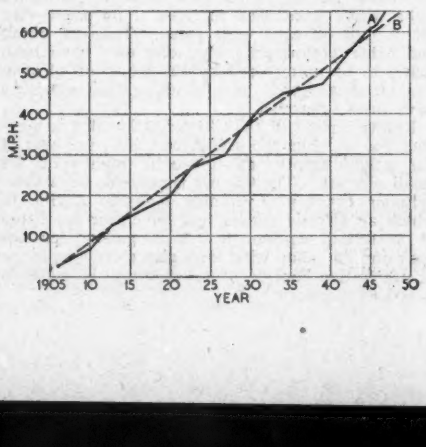


Fig. 1 (left). The speed record, from the first by Santos Dumont in 1906 to the present time.

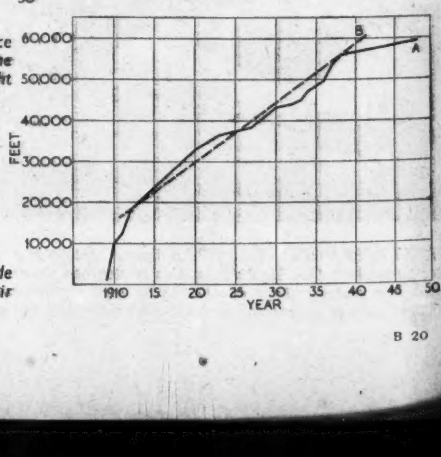


Fig. 3 (right). The altitude record (heavier-than-air aircraft).

boat now under construction for B.S.A.A. will be the largest British aircraft ever built, but the small SR/A1 jet-propelled fighter had shown that a modern flying boat can develop speeds comparable with those of equivalent landplane types. He thought we may yet see the day when the flying boat or seaplane will compete for world records.

Turning to practical performance in relation to contemporary record standards, Major Mayo stated that up till now the cruising speed of transport aircraft was rarely above 85 per cent of the maximum speed. This percentage would rise with jet propulsion and stratosphere flying. A graph was shown (Fig. 4) in which was illustrated the advance in cruising speeds during recent years. The line "B" is the speed-record line from Fig. 1, and line "C" has been obtained by plotting cruising speeds of several representative transport aircraft. Major Mayo had also drawn line "D," which represents half the world-record speed at any time.

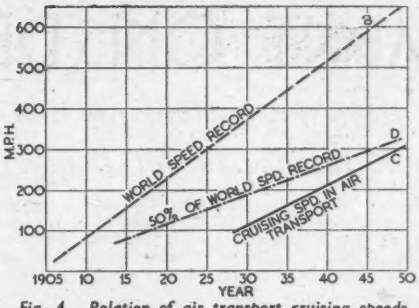


Fig. 4. Relation of air transport cruising speeds to world's speed record.

Due for a Rise

It would be seen, he explained, that actual cruising speeds have been rising towards the half-record standard. If the lines were to be continued at their present slopes, this standard would be reached in about eight years' time. But remarkable things were going to happen during that period, and both the record curve and the cruising-speed curve were likely to take a fairly sharp upward bend, the record curve through conquering the sonic barrier and the cruising-speed curve through introduction of jet and turbine propulsion and stratospheric flying.

The Saunders-Roe SR/45 flying boats were expected to cruise at 380 m.p.h., about half the speed of sound at sea level. It was a nice question, Major Mayo said, whether the speed record will by then have reached the 760 m.p.h. mark. If his guess that cruising speeds will maintain the 50 per cent relationship hold good, cruising speeds of 500 m.p.h. will be current practice by the time the record hits the 1,000 m.p.h. mark.

Major Mayo went on to say that the SR/45 will have a range of 5,500 miles, almost exactly half of the present long-distance record. Present operating altitudes with piston engines go up to about 30,000ft, which is again half the altitude record. The SR/45 will operate at between 35,000 and 40,000ft, and by then the record might well be up to twice that figure.

Without contesting the fact that good aircraft design leads to records, Major Mayo also held that records lead to good design. He put in a plea for Government assistance in the form of free technical help from national institutions when an attempt on a world's record is contemplated. Representatives of the appropriate Government departments and of the Royal Aero Club could form a committee to decide whether or not any proposed attempt was likely to be worth while.

PROMISE OF PARIS

Eighteenth Show Draws Near

WHEN the eighteenth Paris Aero Show opens at the Grand Palais des Champs Elysées on April 29th (and remains open until May 15th) it will mark something of a milestone in exhibition history, for the first Paris Show was held in 1909, and thus 40 years will have elapsed since its inception.

The last pre-war show was in 1938, and the series was resumed in 1946. Under the usual biennial arrangement, the next should have taken place in 1948, but the Grand Palais was not available, and a postponement until this year was accordingly made.

Whether or not the show is of outstanding technical interest, it is sure to attract as many international visitors as ever, if only for the reason that Paris in spring has a proverbial attraction; customarily, of course, the show is held in November. Moreover, the monetary exchange and general conditions in France are in many ways more stable than they were in 1946.

British participation this year is likely to be on a small scale, for it has been agreed that the very heavy expense incurred is unwarranted at the moment; at the same time, there are those in the industry who maintain that the present period of European rearmament is one in which Britain's potential should be publicized. At the time of writing, nevertheless, the only certain exhibitors from this country are (among the major airframe and engine constructors) Bristol and Armstrong Siddeley, while Vickers-Armstrong will have an accessories display only; Alvis engines may be seen as part of a helicopter exhibit; Hunting Aviation are a "possible."

Two stands will be occupied by Bristol products: one will be devoted to the Type 171 helicopter, while the other will carry a sectioned Hermes IV installation of the Hercules 763, a sectioned Centaurus XVIII, and a Proteus turboprop. As is to be expected, the Armstrong Siddeley display will feature turbines, and at least one highly interesting new type is likely to make its appearance

Present indications are that French participation this year will be on a quality rather than a quantity basis with an absence of the somewhat freakish types that have characterized previous shows. It is certain that among other European countries, Sweden, Czechoslovakia and Italy will be represented. America had only half a dozen stands at the 1946 show, but seems likely to make a very much bigger effort this year.

DUNLOP YEAR BOOK

WITH the publication of the 1949 edition of the well-known *Dunlop Aviation Year Book*, the aeronautical engineer is given a compact and yet adequately comprehensive compendium of information and design data on the whole range of Dunlop activity in the aeronautical field.

Starting off with a statement on tyre design, the book then provides graphic data on tyre-loading characteristics and an analysis of tyre construction, before dealing with the parameters governing the selection of tyre size and the design requirements for tyres used with the nosewheel undercarriage layout. Thereafter, no fewer than eleven pages are devoted to statistical data covering the whole range of Dunlop aero tyres.

Wheel design forms the succeeding section of the book, and abridged lists of reference data for mainwheels, tailwheels and nosewheels are included. Thereafter, brake design is considered and, in addition to tabulated data on brake assemblies, a section of technical notes on braking is given, together with nomograms of energy absorption, temperature, torque and landing run. Brake control systems, both of pneumatic and hydraulic type (the latter for use in connection with plate brake assemblies) precede a short section dealing with the differential relay valve, air filter and reduction valve, which concludes the braking section.

Dunlop pneumatic actuating systems are dealt with generally and, in addition, the individual circuits are examined and design recommendations given. Thence follows a number of pages listing the manifold components manufactured by the company, chiefly, but by no means exclusively, for use in connection with the various Dunlop systems.

Hose assemblies, windscreen wipers, and gun-firing gear are dealt with, and information and design data on the large range of bonded rubber-metal and moulded rubber components is given, together with a description of the Dunlop anticer equipment.

STATEMENT ON DEFENCE

Government Aim that High Proportion of Men Should be Regulars: No Reference to Jet Bombers

NEARLY £760 million is to be spent on defence during 1949-50 according to the annual Statement on Defence issued on February 15th. Of this, the Air Ministry is estimated to require just under £207½ million. By the end of the financial year 1949-50 (that is, on March 31st, 1950) it is expected that the strength of the R.A.F. will be 213,000. The man-power plan provides for the calling-up of 44,000 National Service men for the R.A.F. (A quarterly statement by the Ministry of Defence gives the total strength of the R.A.F. on January 1st at 234,000; this figure included 109,600 National Service men.)

The statement points out that many more are needed in the Reserve and Auxiliary Forces. In the R.Aux.A.F. the strength on October 1st was 2,494, and on January 15th, 3,509. The target is 29,000. In the case of the R.A.F.V.R. the corresponding figures are: 2,806, 4,459 and 38,000 respectively.

Following is a breakdown of the sums required for the Air Ministry. The net figures, after deducting appropriations-in-aid, are, in £ millions: Pay of Service Personnel, 55.20; Pay, etc., of Reserve, Territorial and Auxiliary Forces, and grants for administration, 1.18; Pay, etc., of Civilians, 23.85; Movements, 8.62; Petrol, oil and lubricants, 12.75; Food and ration allowance, 10.01; Fuel and light, 2.77; Miscellaneous, 0.51.

Production and research, including the cost of development work undertaken by industry under contract, is estimated to require 64.50; works and lands, 22.62; Miscellaneous effective services, 2.34; Non-effective charges, 3.1. All these add up to a total of £207,450,000.

In the introduction to the Statement on Defence it is pointed out that the problem of to-day has three main features: reconstructing and equipping new units from the residue of our wartime Forces and fitting them into the framework of a long-term defence plan, a plan which must allow for introduction of new weapons and be appropriate to our obligations to the Commonwealth and Western Union, and to any future arrangements concluded for the defence of the North Atlantic area. Then the task of maintaining existing Forces in a condition in which they could resist aggression if suddenly and unexpectedly called upon to do so. Finally, arrangements must be made to meet a whole range of current commitments.

A section deals with a review of what was done during the past year. Readers will already be familiar with what the R.A.F. achieved during that period. Of the Commonwealth collaboration the Statement says it is hoped that it will be possible further to improve, within the framework acceptable to each Commonwealth Government, arrangements for military co-operation and for consultation on military planning. The Government is also examining the sizes of local Forces required in the Colonies.

British Radar Warning System

After reviewing the setting-up of machinery to give effect to the defence obligations assumed under the Brussels Treaty, the Statement explains that a broad review has been made of the present defence production capacity of the five countries in the Western Union, and that plans have been made for equipping the air defences. "Meteors and Vampires are being supplied to France, Belgium and Holland, and arrangements are well advanced for the manufacture of these aircraft in these countries under licence. *British ground radar is also being supplied from the U.K. for an integrated early warning system.*" [The italics are ours—ED.] United States and Canadian observers attend meetings of the Western Union Chiefs of Staff Committee, the Military Supply Board, and the subordinate committees which work for these two bodies.

The Statement then refers to the defence of the North Atlantic area, and points out that the British Government is participating in the discussions now taking place in Washington.

In connection with the man-power problem, the Statement says that much thought has been given to methods of stimulating recruiting. The Government intends that the various attractions of Service life should be "reinforced by conditions of service which are such as to make a wide appeal and to compete on reasonably equal terms with employment in civil life." A comprehensive scheme is also being worked out for providing openings for ex-regulars in civil life. In Government service a proportion of vacancies for the clerical and executive classes will, in future, be reserved for competition among ex-regulars. Trades Unions have agreed that men trained in a wide range of Service trades should be recognized as qualified for membership as skilled men, and discussions are proceeding with a view to recognizing the status of other Service tradesmen. There will also be schemes of training to assist selected candidates who wish to enter business.

The Statement also stresses the importance of the Reserve and Auxiliary Forces, and of the Women's Services. On the subject of equipment, after stating that additional aircraft will be provided for in the Navy programme, and the development of new types be continued, the Statement goes on: "The Royal Air Force programme continues, at an increasing rate, the re-equipment of the fighter squadrons with the latest type of jet aircraft and provides for the gradual replacement of transport and training aircraft by modern British types. In addition, the reconditioning of wartime stocks of fighter aircraft, undertaken as one of the precautionary measures, will continue. Re-equipment will extend to certain major items in the field of tele-communications and radar. A considerable vehicle repair programme will continue."

The Statement is reticent about research and development, but it does mention improvements in radar for the location of targets and for fire control; improvements in anti-aircraft fire control. "Notable advances," the Statement continues, "have been made in turbojet and turbo-propeller aero engines and in the design of aircraft, and we have extended our knowledge about flight through the transonic zone and into supersonic speeds. . . . Research and development directed to the production of unconventional weapons is proceeding on high priority, and such weapons will be brought into service as and when they are ready. Meanwhile, the Services must be ready, if need be, to fight with the weapons of to-day."

Additional Expenditure

Supplementary Civil Estimates, published a few days before the Statement on Defence was issued, disclose that for aircraft, aircraft equipment and supplies an additional net sum of £5.1 million is required. The original Estimate was for £76.4 million, but the revised Estimate is for £81.5 million. The additional provisions are: For aircraft, airframes and aircraft repairs (military), £4.8 million; airframe spares, propellers and gun turrets, £1 million; aero engines, aero engine spares and repairs, £2.3 million. That would give a total of £8.1 million, but savings on other items provided for in this sub-head amount to £3 million, thus bringing the net additional requirements to £5.1 million.

The total amount required for the Ministry of Supply is reduced, so far as aircraft is concerned, by an expected surplus of £7.35 million (receipts from the Air Ministry). However, this is to some extent offset by an expected deficiency of £5.9 million at the Ministry of Civil Aviation.

TURBINE STARTER

FURTHER details have been released concerning the operation of the gas turbine self-starter system for jet aircraft, developed by AiResearch Manufacturing Co. for the U.S. Navy, first mentioned in *Flight* on January 6th. The system consists of an electrically started gas turbine supplying compressed air to a pneumatic starter, which engages the main power unit. Energized by a ¾ h.p., 24 volt electric motor, the auxiliary turbine fires at about 6,000 r.p.m. Air is drawn into a two-stage centrifugal compressor through a vertical intake and directed into two parallel combustion chambers; it is then mixed with fuel from the aircraft's main supply, and ignited. The products of combustion pass into the periphery of a Schmidt-type centripetal-flow turbine and are ejected rearwards along the centre-line of the unit. When the starter-turbine has reached 40,000 r.p.m. air bled from its compressor casing is admitted, through a shut-off valve, to the main power unit's air-cycle turbine-type starter. This, weighing 20 lb and developing 35 h.p., turns the aircraft's turbojet or turboprop up to the r.p.m. required for starting.

CORRESPONDENCE

The Editor does not hold himself responsible for the views expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters.

FIRST "HEAVIER THAN AIR"

To Which Squadron Should the Honour be Awarded

AS an old member of No. 2 Squadron I am prepared to put up with No. 1 Squadron being the first to fly an aeroplane, but when you jump to No. 3 Squadron and call it "Britain's premier 'heavier than air' Squadron," then I must protest.

What has No. 2 Squadron done to deserve such treatment—will no-one in the Squadron today fight for their honour?

C. R. L. (2 Sqn., 1930).

[*In this matter it is "Flight's" desire only to be accurate. If C. R. L. will produce historic authority for his contention we will incorporate it in the history of No. 3 Squadron, which we intend shortly to publish.*—ED.]

JUNIOR MET. ASSISTANTS

Alleged Inexperience

HAVING read your account of the inquiry into the cause of the K.L.M. disaster at Prestwick, in which doubts were raised concerning the accuracy of a weather report issued by an eighteen-year-old Met. assistant, I thought the following might be of interest to yeu.

I flew recently as Air Quartermaster on the crew which took a senior officer to a well-known R.A.F. station. After our arrival the aircraft was towed out to a dispersal line across the airfield.

At 2230 hours (approximately) on the same day I had occasion to visit the machine, and the display of Northern Lights became so bright, with waving "curtains" of red, blue and white, that it resembled a false dawn, and the aircraft was perfectly visible from a distance of several hundred yards.

On returning to the main buildings I saw the two adolescent Met. assistants, in charge for the night, gazing open-mouthed at the display above; and as they had both "presumed" that there was a fire "or something," I explained the phenomenon to them.

Though they may lack experience, I see no reason why, after a Government course of instruction, a minor cannot carry such responsibilities as satisfactorily as an adult. But having issued all the current posters and publications on Accident Prevention, surely it is in the interest of the Air Ministry to ensure that the watchkeepers on airfields under its control have received a thorough training?

Finally, as the term Aurora Borealis meant nothing to either, I had to write it down for them on a piece of paper, and also advise them how to phrase their recording of it (I presume they did keep a time-log). When I expressed surprise at their ignorance, one replied, "Oh, we were pushed through our course in a hurry."

These two Meteorological Assistants had no knowledge whatsoever of a natural phenomenon quite common in these latitudes.

Flying crews are entitled to ask: "Of what else are they ignorant?"

Prestbury, Ches. ROBERT T. NEEDHAM.

ALTIMETER SETTINGS

Q.N.H. Must be Used at High-level Airfields

I HAVE read with interest the correspondence in your columns concerning Altimeter Settings and, in particular, the letter in your February 3rd issue by Mr. J. Scott.

I would like to point out to Mr. Scott the following facts:

Q.N.H. will *always* give you airfield height on your altimeter on landing. This Q.F.F. will *not* always do. The last statement is true at high-level airfields.

The reason is as follows: Q.N.H. is Q.F.E. (airfield level pressure) converted to sea level on the I.C.A.N. atmosphere assumption (i.e., an increase of 1.98 deg C /1,000ft). Q.F.F. is Q.F.E. converted to sea level, assuming the station level temperature at sea level. Now the altimeter reads a pressure difference, the difference between the environmental level pressure and the pressure set on the sub-scale, as a height in the I.C.A.N. atmosphere. Therefore, Q.N.H. will always give us airfield height on landing, while Q.F.F. will only give the correct height if the airfield level is not high enough to make any practical difference between the assumption of an increase in temperature of 1.98 deg C /1,000ft and a constant station level temperature at sea level. That means that Q.F.F. and Q.N.H. to the accuracy we can set on our altimeters will have the same value in this country.

With regard to Mr. Scott's suggestion that Q.F.E. is the best setting for a landing approach, I fully agree. But I would ask him, has he ever flown from an airfield at sea level to one about 5,000ft above sea level? This will require, with average conditions, a change in sub-scale readings from approximately 1,013 mbs to approximately 850 mbs! It can often occur, when the Q.F.E. at the high level airfield is less than this, that the altimeter settings will not give a low enough reading to permit this value to be set. Q.F.F., I can assure him, will not give him his airfield height on landing; but Q.N.H. will.

The important point is that, so far as possible when adopting settings for use, we want as few as possible to avoid confusion; the report of the accident at Northolt on July 4th, 1948, printed in the same copy of *Flight*, illustrates this point.

To sum up, Q.F.E. cannot be used on a world-wide basis, therefore at certain high-level airfields we must use Q.N.H. and land with airfield height showing on the altimeter. What, then, is the use of Q.F.F.? A. J. PLOWMAN.

Hamble, Southampton.

R.A.F. AIRCREWS

They Also Have Their Complaints

HOW many people are aware of the disturbing number of aircrew cadets who go voluntarily redundant in order to obtain their release from the service?

Many complain that after a long, tiresome, cross-country exercise they are ordered to polish the crew room and do other "necessary bull."

Most cadets have little or no leave between training periods, and a 48-hour pass is something which is worshipped, especially by the married men.

The ground staff have their moan, so let's turn to the other side—the present conditions for our much-needed aircrews.

Coventry. LEWIS G. COOPER.

MANNING THE R.A.F.

The Right Kind of Discipline

THE administrative problems disclosed by recent correspondence on this vexed subject all turn upon a point which, if an ex "Brown-Job" may hazard an opinion, is at once a strength and a weakness in the R.A.F. set-up, namely the division into sections under:—

(a) General Duties, Equipment, Technical, and
(b) Administrative and Special Duties Branches.

So far as one can understand from the bitter comments of the disgusted O.R.s, they are delivered daily by some loathed "Admin." representative to some rather less loathed "Technical" representative for whom they labour until such time as they return into the care of "Admin." at the end of the working day.

No officer for whom they work, and, in war, fight and possibly die, appears to have any responsibility for the immediate day-to-day welfare and happiness of "his" men. I may have failed to read between the lines correctly, but nowhere have I seen any reference to "my" officer or "our" officers, and the only recurring references are those of an apopletic nature towards the S.D. and Admin. people who, one gathers, are the only representatives of authority ever seen by the unhappy airman, intelligent or otherwise. Does no officer ever have placed squarely on his shoulders the responsibility for X men with a clear understanding that if these X men are unhappy, worried, fed-up, bored, unoccupied, disgruntled, frustrated, it is his pigeon?

"Discipline," said General Slim, "exists when a man knows to whom he must go for instructions"—and he meant "in the assurance that he will receive sensible, thoughtful, practicable instructions from officers who understand and *care for* his problem." This is the discipline that the British man and woman will accept in any Service, and has accepted since the days of Nelson.

When they have that discipline, and the feeling that "their" officers care about 'em, they won't worry if the officers have better accommodation than they. In fact, in more instances than not, they will see to it themselves that

Correspondence . . . . . .

"their" officers get it—even if they have to pinch or scrounge it from some other unit's officers. And "their" officers will not forget the old Active Service Rule—"Men feed first, officers afterwards—if there's any left."

How to get that spirit into a peacetime organization where vast numbers of men live a semi-civvy life in permanent quarters is a man-management problem I wouldn't ask for, but General Wavell once said "Service life consists of long periods of inactivity interspersed with periods of intense activity," and he also said "Give your men the best you can give 'em when circumstances allow, and then drive them hard when you have to."

Somewhere in the interpretation of those last two sentences the R.A.F. set-up falls down, if the O.R.s are to be believed, and it would be more than useful to find out where.

Sheffield, 10. EX-"BROWN JOB."

MANNING THE R.A.F.

Differentiating Between Air and Ground Crews

I THINK, in considering the R.A.F., one must understand and admit the vast difference between the air and ground counterparts. The aircrew man takes great personal risk in war and some risk in peace. The ground man or woman takes little risk in war and practically none in peace. On the other hand, they perform valuable functions, without which flying could not take place.

I was a flying-control officer. The better to do my job, I flew as much as possible but was never allowed on operations. I was called a Flight-Lieutenant. I had only some very slight justification to the "Flight" part of the title.

The officer in charge of a laundry at an overseas station was a "Pilot" Officer. He was humiliated by the ludicrous title. Let us start to put R.A.F. organization right by ending such titles for non-flying men. We can take over the Army titles entirely, merely sticking the word "Flight" in front of the title when the holder has his wings.

Then we can get away from musical-comedy devices on aircrew arms and ranks which are regarded as neither those of officers, N.C.O.s nor men. The majority of the R.A.F. ground jobs could be done in Britain and some stations abroad by locally recruited civilian labour, men and women who are paid to do both unskilled and tradesmen's jobs at T.U. rates, who put on a R.A.F. overall on entering the station and take it off again on leaving, whose discipline is the normal one of being fired for inefficiency and promoted for good service. All cleaners, waiters, cooks and the like should be locally recruited as civilians; so, too, could many mechanics, radio operators, clerks, etc., if they were assured of proper rates of pay and conditions.

There is a great gap between the older officers and the next generation, who have modern combat flying experience. Over and over again I saw Squadron Commanders thwarted by "dead beats" of Station Commanders completely out of touch with the situation, living lives of safety and comfort on the same station at which their subordinates were consistently risking their necks. There were, of course, notable exceptions, where Station Commanders supplied leadership, but such was often the general picture.

Indeed, the flying and non-flying people of the R.A.F. are almost two services. Let the non-flying men and women be organized, named and paid for their static and ancillary nature, their skill, their hard work and sense of responsibility. Let the flying men be organized, named and paid for their mobility, the risks they take and their skill.

On the much-discussed question of ceremonial, small-arms training and parades of all kinds, it is my opinion that they do more harm than good at home stations. Ground weapon training could be reserved for those posted overseas, and at home, in time of war, taken care of by a Station "Home Guard," which all would be called upon to join.

On the other hand, voluntary sports are a great builder of *esprit de corps*. So-called "Air" men don't want to be chivvied and ordered in and out of camp like children at a boarding school. The criterion of their behaviour should be their ability and attendance at their job in a fit condition for carrying it out, together with personal cleanliness and cleanliness of their quarters.

Finally, for regular-service officers and men who are subject to mobility and posting, let there be proper housing for their families instead of the present arrangements which, too often, mean separations, appalling expenditure on housing, and a losing struggle to make ends meet.

EX FLIGHT(?) LT.

Chesham Bois, Bucks.

THE LOSS OF THE TUDOR IV

Fitting of Automatic Transmitter Suggested

MAY I be permitted to make yet one more comment in issues raised by the loss of the second Tudor?

I accept that accidents are unavoidable—but hold that rescue services can be accelerated and concentrated when they do occur. This is especially true when long oversea flights are under consideration, for not the least mystery and difficulty concerning the *Star Ariel* was the lack of signals and consequent inability to concentrate the search. It would appear, then, that some revision of position checks at more frequent intervals during flight is to be desired.

Initially, there appears to be no undue difficulty in this, except that it implies the continued serviceability of wireless gear and operator. Consequently, there is the probability of search being delayed till the aircraft is overdue and the assumption made that one of the two has failed, this apparently being the case with the Tudor, as reports speak of search of 177,000 square miles being made, due to lack of pin-points.

It must be assumed, moreover, that if disaster is due to structural failure, fire, air turbulence (or sabotage), there will be little time for the W/Op. to get a message out, due to loss of power supply or destruction of his gear. Even if a brief message is transmitted as the aircraft is presumably falling rapidly there will be fading at any D.F. station which may happen to pick it up. Consequently, there is little hope of making a fix.

I suggest, then, that a small transmitter (similar to those used on Met. balloons) could be installed in a fairing beneath the fuselage, capable of push-button release by any crew member. This would descend by parachute, transmission being actuated by release from the aircraft and on any accepted distress frequency. In addition, it could be fitted with (a) a flotation unit so as to continue functioning on striking the sea; (b) a reflector to facilitate detection by aircraft equipped with radar search gear. Power supply, of course, would be by H.T. battery, the whole in fact being a development of the "Walter" radar distress beacon as used on R.A.F. dinghies. The point of this unit is to concentrate search, even if finally no wreckage is left afloat, the only assumption being that disaster is not quite instantaneous, but too sudden to allow adequate transmission of distress signals by the W/Op.

I trust that in the Tudor inquiry it will be shown, too, that there was no doubt that relevant W/T stations were alert and reasonably sure of picking up any distress signals sent.

G. S. ORCHARD,
Late Radar Sec., 1349 A.S.R.U.

Cambridge.

FORTHCOMING EVENTS

Feb. 24th.—R.Ae.S. (Manchester): "The Development of the Mamba Engine," A. S. Lindsey, M.A., A.F.R.Ae.S.

Feb. 24th.—Royal Aeronautical Society: "Flutter and Stability," Prof. W. J. Duncan, B.Sc., F.R.Ae.S., M.I.Mech.E., F.R.S.

Feb. 24th.—R.Ae.S. (Isle of Wight): "Naval Aircraft," Lt. Cdr. E. M. Brown, O.B.E., D.F.C., M.A., A.F.R.Ae.S.

Feb. 26th.—Society of Licensed Aircraft Engineers (South Eastern Area): "Airframe Repairs," G. C. Banks.

Feb. 26th.—Helicopter Association of Gt. Britain: "Helicopter Transmission Systems," K. Watson, A.R.Ae.S.

Feb. 28th.—Institute of Public Administration: "The British Overseas Airways Corporation," J. O. Blair-Cunynghame.

Mar. 2nd.—R.Ae.S. (Luton): "Evolution of a Modern Aeroplane," Prof. R. L. Lickley, B.Sc., D.I.C., F.R.Ae.S.

Mar. 2nd.—R.Ae.S. (Graduates' and Students' Section): "The Development of the Brabazon I," G. P. Hebden, A.F.R.Ae.S.

Mar. 3rd.—R.Ae.S. (Gloucester and Cheltenham); "Electrical Aircraft Instruments," E. B. Moss, B.Sc., F.Inst.P., M.I. Mech.E. (*At Gloucester.*)

Mar. 5th.—Rugby Football, Twickenham, Royal Navy *versus* The Army.

Mar. 5th.—Royal Aeronautical Society: Full day Discussion on Air Safety.

Mar. 7th.—R.Ae.S. (Derby): "Helicopters—The Technical Point of View," Capt. R. N. Liptrot, C.B.E., B.A.

Mar. 8th.—R.Ae.S. (Southampton): Lecture by A. G. Pugsley, O.B.E., D.S.C.

Mar. 8th.—R.Ae.S. (Belfast): "Helicopter Design," T. E. Goligher, B.Sc., D.I.C., A.F.R.Ae.S.

Mar. 9th.—R.Ae.S. (Weybridge): "Air Force Requirements and their Origin," Air-Cdre, G. W. Tuttle, C.B., C.B.E., D.F.C.

Mar. 9th.—R.Ae.S. (Preston): "Recent Developments in Aircraft Production Engineering." Professor J. V. Connolly, B.E., A.F.R.Ae.S.

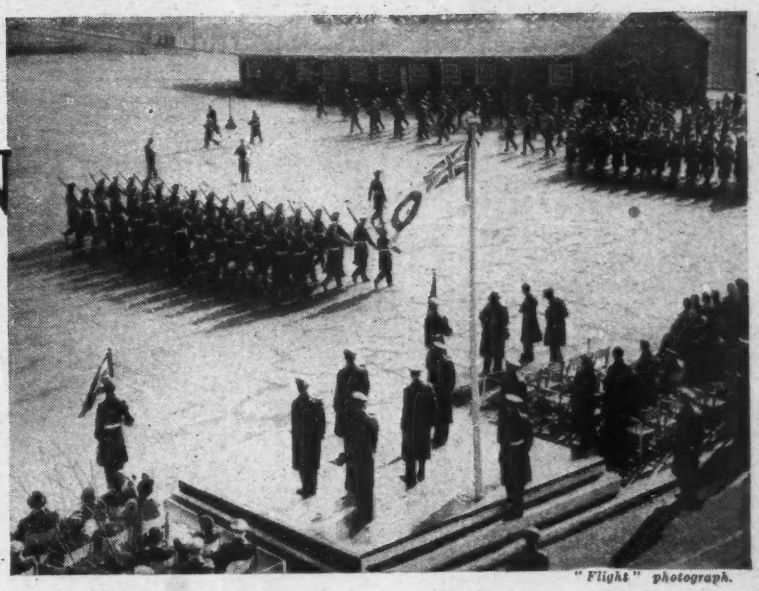
Mar. 9th.—R.Ae.S. (Leicester): "Charter Flying" Sqdn. Ldr. Wright.

Mar. 10th.—R.Ae.S. (Isle of Wight): Lecture by N. E. Rowe, C.B.E., D.I.C., B.Sc., F.R.Ae.S. (Provisional).

Mar. 10th.—Timber Development Association: "Modern Adhesives—Their Present and Future Application." D. A. Hubbard.

SERVICE AVIATION

Royal Air Force and Naval Aviation News and Announcements



"Flight" photograph.

MARCH-PAST: The scene on the parade ground at Halton during the passing-out parade of the 52nd Entry of No. 1 School of Technical Training. An account of the parade appears on page 222.

R.A.F. Appointments

AIR VICE-MARSHAL W. A. D. BROOK, C.B.E., has been appointed Chief of Staff to Air Chief Marshal Sir James Robb, the Commander-in-Chief, Air Forces, Western Europe. Since August, 1946, A. V-M. Brook has been Director of Policy (Air Staff), before which he was A.O.C. at Air H.Q., Hong Kong, for nearly a year. For two years previously he was Director of Plans (Air Staff) at Supreme Allied Command H.Q., South East Asia, and at Air Command, S.E.A.

Until recently Commandant of the R.A.F. Regiment's Central School at Catterick, A. Cdre. H. J. G. E. Proud, C.B.E., will shortly become Base Commander of the R.A.F. Far East maintenance base at Seletar, Malaya. Before going to Catterick in August, 1947, A. Cdre. Proud had served at the Air Ministry as Director of Ground Defence since October, 1946. He was commissioned in the R.A.F. in 1926, and commanded No. 5 (Army Co-operation) Squadron on the north-west frontier of India during 1937-38.

Air Commodore R. B. Jordan, C.B., D.F.C., is to command the Royal Observer Corps, in place of A. Cdre. the Earl of Bandon, who is taking a course at the Imperial Defence College. A. Cdre. Jordan has been A.O.C. Gibralter since February, 1948, and previously spent 14 months in India, as A.O.C. No. 3 and No. 1 (Indian) Groups. After the partition of India he was chief of staff to the A.O.C.-in-C., and finally became A.O.C. the R.A.F. in India and Pakistan.

"Biggin" Activities

MAKING the most of the splendid weather last week-end, Nos. 600 and 615 R.Aux.A.F. squadrons were busy practising high-speed interceptions.

On Sunday afternoon they were visited by A.V-M. S. F. Vincent, A.O.C. No. 11 Group, and A. Cdre. McEvoy, who has taken over the command of No. 61 Group following A. Cdre. Sir Harry Broadhurst's move to the Imperial Defence College.

F/L. Sowrey was posted from No. 615 a short while ago and the three regular officers of the unit now are F/L. Lang, F/L. Gaston and F/L. Weir, the last-named being the engineer officer. At the moment No. 615 is without a commanding officer but an appointment is expected shortly. Tangmere will be the venue for the summer camp this year and it will be held in August.

No. 600 are at last fortunate in getting a hangar to protect their Spitfires, which now begin to look very smart in their new coats of aluminium dope. The squadron's summer camp will be at Thorney Island from June 11th to 25th.

The Royal Air Force team which defeated fourteen Navy men in the first of the season's inter-Service Rugby Football matches. Names are given at the end of a description of the game overleaf.

"RAT Group" Visited

THE Under-Secretary of State for Air, Mr. Geoffrey de Freitas, left Northolt in a Lancastrian on February 18th for a visit to the Rhodesian Air Training Group of the R.A.F. Flying by way of El Aden, Khartoum, and Nairobi, he was due to arrive at Heany, S. Rhodesia, on Monday, February 21st. Mr. de Freitas, who is accompanied by his private secretary, Mr. J. A. Millson, and his personal air secretary, W/C. A. V. R. Johnstone, D.F.C., will leave Heany next Sunday, returning to Northolt on Wednesday, March 2nd.

Changes in "Plainfare"

AMONG recent measures to increase the efficiency of the Air Lift have been a rearrangement of aircraft routing into Berlin, and the introduction of a new unloading technique at Gatow. With the object of spreading the load more evenly at the Berlin airfields, aircraft operating from Fassberg, Fuhlsbuttel and Schleswig-Land (American Skymasters, civil freight aircraft, R.A.F. Hastings and a few of the civil tankers) now land at Tegel, the new airfield in the French Sector, while aircraft from Celle, Wunstorf and Lubeck (Skymasters, R.A.F. and civil Yorks, civil tankers and R.A.F. Dakotas) operate into Gatow. Formerly Tegel handled Skymasters

Service Aviation . . . . .

from Fassberg and Celle and the R.A.F. Dakotas.

The new unloading method at Gatow, which has been developed in collaboration with Army unloading teams, involves the use of a jeep fitted with two-way radio which is in communication with a special control tower dealing solely with unloading. The unloading bays can be observed from this control tower, and any matters which might cause delay can be dealt with immediately. The average time for unloading an aircraft has been reduced to 15 minutes. As unloading is completed, the control tower notifies the aircrews in their lounge, over the public address system, so that the aircraft can leave promptly.

R.A.F. Permanent Commissions

GENERAL DUTIES BRANCH.

Squadron Leaders: P. E. L. Halls. H. H. Moon.

Flight Lieutenants: R. H. Burr, D.F.M., N. J. Cape, S. W. F. Daniel, D.S.O., D.F.C., J. T. Hart, G. A. Hatton, D. F. Holmes, W. J. Ives, C. King, D.F.M., A. Knapper, M.V.O., A.F.C., R. E. Le Long, D.F.C., R. A. McKay, P. A. L. Murray, G. Strange, J. R. Tanner, E. T. Walter, A. D. Woodcock, S. H Worton.

Flying Officers: R. D. F. Bowen, A. J. Lee, R. W. Partner.

TECHNICAL BRANCH.

Squadron Leaders: K. B. Pearse, F. P. Woodcraft.

Flight Lieutenants: J. Edwards, L. G. Goodey, D.F.C., J. Lee, K. O. Lockyear, W. Murphy, C. H. Pascall, A. F. Renton.

Flying Officers: R. Brickwood, N. M. Cotton.

EQUIPMENT BRANCH.

Squadron Leaders: M. C. Mainprice. R. Taylor.

Flight Lieutenants: D. E. Getgood. T. C. Gould, T. Jones. A. A. Storar.

Flying Officers: R. F. Carter, G. C. Mitchell, D. W. Reynolds, P. B. Shipp.

SECRETARIAL BRANCH.

Squadron Leaders: G. T. Dodgshun, F. Hugill.

Flight Lieutenants: E. C. Bale, J. B. Ball, H. E. Boothby, L. O. de Courcier, R. T. M. Dennehey, R. W. Harte, G. D. N. Noel-Johnson, D. G. Rodgers, W. A. Wilkinson.

Flying Officers: W. G. Brown, J. Cope, J. Culpan, J. E. V. Davies, C. J. Edwards.

R.A.F. REGIMENT.

Flying Officers: G. W. Foskett, G. G. Whittle, D.F.M.

AIRCRAFT CONTROL BRANCH.

Squadron Leader: W. H. Forster.

Flight Lieutenants: J. S. Aldridge, A.F.C., N. T. H. Holland, M. G. L. Lovell, H. McCulloch, J. W. G. Smith, D.F.C.

Flying Officer: J. Webster.

DENTAL BRANCH.

Flight Lieutenant: J. D. Roden, L.D.S., R.C.S.I.

R.A.F. VERSUS R.N. AT TWICKENHAM

11—0 *vt. Win for the Air Force*

THE first round of this year's inter-Services Rugby Football tournament resulted in an open, hard-fought game which might well have produced a very different result. Within a few minutes of the kick-off Burges, the Navy scrum half, charged down a kick and unluckily received a fractured jaw. This necessitated a major reshuffle and weakening of the Navy side. Barras moved in to scrum, Kirby, the full back, took his place at stand-off and a forward, Kelly, went to full back. The seven Navy forwards held their own very well indeed, but the ball went much more frequently from the set scrums to Hay, the R.A.F.'s energetic scrum half. Lumsden at stand off was always there to take Hay's long and often reversed passes, and did sterling defence work, including fine, long kicks for touch. Both halves were left relatively unmolested, which would certainly not have been the case with Barras in his correct position and Burges on the field.

The Navy outsides were faster and looked more dangerous than their opponents, and on several occasions Holgate, the left wing, narrowly missed getting clear to score. He ran very fast indeed, invariably handed off his opposing wing, and often a second defender. Smailes, the R.A.F. full back, was then, however, ready for him. Unlike the Navy centres who tackled well there was a tendency by the R.A.F. outsides to hesitate about going for the man with a ball. More than one opening and dangerous situation resulted.

A large number of penalties chiefly for offside were awarded but the Navy were unable to kick a single goal from at least half a dozen attempts and the R.A.F. only kicked one. It must be admitted that the strong wind was partly responsible for this and for the short though safe touch kicking by Smailes in the first half. In addition, the Navy had been deprived of the services of Burges as a place-kicker.

Both teams handled the ball well, and it was seldom that an outside was caught in possession. Several times in defence, however, the ball was thrown about near the R.A.F. line in an alarming manner.

Scoring opened after twelve minutes with a penalty goal by Smailes for the R.A.F. The Navy fought back and there was a good run by Glastonbury, the right wing. Kelly, the substitute full back, made the first of his surprising individual "defensive" dashes, gaining much ground and forcing past half the R.A.F. side before being pulled down. He was obviously uncomfortable when fielding and kicking, and following a nasty head-on collision later on, appeared dazed for some minutes of the game.

Spectators were treated to a hard-fought, open game at Twickenham on Saturday, February 12th. F/L. Hay, the R.A.F. scrum half who threw some remarkably long and accurate reverse passes, is seen in action.

An R.A.F. forward rush next took the ball over the line. It bounced back off a post when being dribbled but Ross, well up, grabbed it and put it over in the centre. Smailes' easy kick failed.

The Navy outsides continued to look the more dangerous. Thomas at left centre took an obvious opening, cut through well and put Glastonbury on the way to the line. His speed was not sufficient, however, and he was intercepted. Barras twice got free of the scrum and gave momentary examples of his speedy, elusive running.

At half time with the score 6-nil to the R.A.F. the Navy turned to face the wind. Lumsden began to make use of the kick ahead and it was not long before this paid with a try by Rossiter who won a good race for the touch down. This was converted by Smailes to give the R.A.F. their 11 points to nil final score.

In the late stages, the game became pretty rough and both sides made some determined attacks. Holgate continued to be both fast and menacing to the R.A.F. line. He would be much harder to stop if he could side-step without stopping his run. The Navy were very unlucky not to score. Lumsden did a big share of work for his side and was responsible for a good proportion of the score. The teams were as follows:—

Royal Navy: Inst. Lt. T. K. M. Kirby (H.M.S. Ariel); Lt. R. M. Holgate (R.M.); Inst. Sub.-Lt. M. C. Thomas (H.M.S. Vernon); Surg. Lt. S. D. Walsh (H.M.S. Merlin); Inst. Sub.-Lt. W. J. Glastonbury (H.M.S. Vernon); Surg. Lt. T. C. Barras (H.M.S. Victory); Ord Seaman J. H. Burges (H.M.S. Victory); Lt. (E) P. B Sindery (H.M.S. Daedalus); L.R.E.M. K. Baker (H.M.S. Pembroke); Lt. D. P. W. Kelly (H.M.S. Blackcap); Inst. Lt. A. Meredith (H.M.S. Thunderer) (*Captain*); Lt. B. P. Elvey (R.M.); P.O. C R. Ransome (H.M.S. Excellent); Lt. (E) R. W. Hart (H.M.S. Thunderer); Lt. F. H. Bristowe (R.M.).

Royal Air Force: F/L. A. A. Smailes (Driffield); F/L. J. D. Ross (Scampton); A/C. G. Crean (Scampton); W/C. B. P. Young (Air Ministry); F/L. L. L. Doveton (Birmingham U.A.S.); F/L I. J. M. Lumsden (Abingdon); F/L. W. T. H. Hay (Cranwell); H. K. Rees (Ternhill); F/L. R. G. H. Weighill (Cranwell) (*Captain*); F/L. E. L. Horsfall (Stradishall); Cpl. E. E. Rossister (Sutton Coldfield); F/L. R. Stirling (Norton Disney); F/L. T. H. Pitcairn-Hill (Hendon); A/C. R. Clark (Yatesbury); F/O. C. M Browse (Halton).